

in areas adjacent to high salt marsh, our efforts can target Henslow's sparrow as a priority species while also serving to umbrella habitat requirements for other grassland species, such as northern bobwhite and various species of waterfowl, raptors, shorebirds, upland gamebirds, and songbirds that need grassland habitats for nesting and other habitat functions. The Henslow's sparrow nests in the highest portion of high marsh zones within the marsh/upland ecotone. This habitat is often linear and characterized by stands of salt meadow hay interspersed with shrubs that grade into patches of switch grass. Availability of switch grass seems to be important to the distribution of these sparrows (Zimmerman 1988 and Smith 1992). Maintaining grassland habitats near high salt marsh areas would also benefit coastal plain swamp sparrow, short-eared owl, eastern meadowlarks, migrating savannah sparrow, vesper sparrow, grasshopper sparrow, willet, sedge wren, horned lark, northern harrier, black-bellied plover, and Canada geese. In addition to birds, species such as migrating and resident butterflies, frosted elfin, American burying beetle, eastern box turtle, milk snake, least shrew, and rare native plant species would benefit.

As with shrubland management, maintenance of grassland communities will require periodic disturbance, resulting in a range of seral stages over time or space. The result of this is a diversity of grassland structure (short, medium, tall) at any one time and in any particular place, each potentially serving the habitat needs of different suites of species.

Many of the refuge's upland fields proposed to be managed in accordance with objectives 4.1 and 4.2 have been part of the refuge's cooperative farming program. In the past, the primary objective of the farming program was to provide food for certain duck species (mallard, American black duck, northern pintail, and wood duck) and Canada geese during the fall, winter, and spring. A secondary objective of the farming program was duck production; croplands in grass or clover stages of rotation were designed to provide nesting habitats for ducks. In recent years, duck species seldom or never used cropland field habitats due to plentiful wetland and aquatic habitats available on refuge marsh habitats. Sufficient natural foods are also produced to satisfy the needs of Canada geese in these habitats, especially if measures are taken to reduce snow goose numbers. Waterfowl production is no longer a management objective for Prime Hook NWR, so promoting early successional grass or clover to provide nesting cover is unnecessary. Finally, the elimination of farming on the refuge is consistent with recommendations in the Service's final environmental impact statement on the management of light geese (USFWS 2007a), which encourages refuges to reduce areas planted to agricultural crops that serve as a supplemental food source for overabundant greater snow geese. Managing a portion of these previously farmed acres as grassland and other transitional habitats better serves numerous refuge objectives.

#### **Strategies for Objectives 4.1 and 4.2**

- Implement field management prescriptions outlined in the habitat management plan (appendix B).
- These proactively restored or naturally succeeding areas will occur as a shifting mosaic of patches across the refuge's landscape as we implement decisions to allow open fields to grow to shrub and young forest, maintain early successional grassland patches near salt marsh habitats, or retain field openings adjacent to upland mature forests.
- Increase shrubland and forested buffered areas (greater than 200 m) adjacent to refuge creeks, depressional swamp and emergent wetland habitats, or restore prior converted wetlands for targeted species in both objectives 4.1 and 4.2.

- Use the U.S. Geological Survey publication “Conceptual Ecological Model for Management of Breeding Shrubland birds in the mid-Atlantic Region” (Peterjohn 2006) as a guide to restore and maintain shrubland habitats.
- Develop rotational management action schemes for prescribed fire, mowing, application of herbicides, etc., to create and maintain habitat conditions specified in objectives 4.1 and 4.2; more information on optimal disturbance schedules for shrubland management and other best management practices is currently being reviewed by the regional shrubland management work group.
- Engage the public in outreach and education about the benefits of pollinators, instilling a greater appreciation for invertebrates and their essential links to biological integrity, diversity, and environmental health.

#### **Monitoring Elements for Objectives 4.1 and 4.2**

Conduct appropriate monitoring and survey programs as funding and staffing permit to measure our success with respect to our objectives. The results may trigger adjustments to management strategies, or reevaluation or refinement of our objectives. Details of planned monitoring will be developed in a subsequent inventory and monitoring plan. Examples of monitoring or surveys that we may implement include:

- Prevent new invasive species from becoming established by utilizing early detection rapid response techniques that detect newly established invasive species, and immediately addresses those populations through the appropriate control measure. This approach will incorporate a combination of plant identification and inventories, maintaining updates of new invasive species present in the region, and knowing the appropriate management techniques prior to conducting control efforts.
- Develop monitoring protocols for targeted breeding and migratory birds dependent on early successional habitats.
- Conduct annual habitat condition assessments to determine what habitat management actions should be prescribed in annual habitat work plan.
- Develop GIS layers (e.g., RLGIS or similar) needed to document restoration and habitat management actions by field number, along with refuge management actions database to tract shifting mosaics of transitioning habitats.
- Explore the possibility of applying a current arthropod index of biological integrity for shrubland landscapes (Karr et al. 2003) and other shrubland metrics, in consultation with other refuges, as a standardized multi-metric index tool to assess the condition and restoration efforts of early successional upland habitats

#### *Sea Level Rise and Climate Change Strategies and Monitoring*

Sea level rise and climate change strategies are the same as those listed above and under objectives 2.1, 2.2, and 2.3.

#### **GOAL 5:**

##### **Visitor Services**

Provide visitors with a place to safely take part in the six priority wildlife-dependent recreational uses established by the Refuge Improvement Act, as well as other public uses as may be allowed without interfering with refuge purposes and objectives for wildlife.

## **Objective 5.1 Hunting**

Provide a high quality hunting program that is administratively efficient and used to maintain healthy habitats through the management of wildlife populations, where appropriate.

### **Rationale**

Additional information regarding the proposed hunting program can be found in the compatibility determination in appendix E, and in the hunting management plan in appendix C.

*Summary.* To improve the refuge's hunting program, we evaluated hunting use on the refuge, incorporated the opinions of hunters, and developed this plan in collaboration with our State partners in the Delaware Division of Fish and Wildlife. These program changes, which reflect a diversity of hunting preferences and opportunities, strive to meet the guiding principles for a quality refuge hunting program identified in Service policy 605 FW 2. They also support Presidential Executive Order 13443: Facilitation of Hunting Heritage and Wildlife Conservation.

The hunting program has been adjusted to allow for more effective consumptive recreation opportunities along with an increase in opportunities for non-consumptive users to appreciate the refuge while avoiding conflicts with hunters. Our preferred alternative is to expand some aspects of the hunting program to include additional days and acres throughout the hunting seasons established by the state. Deer hunting acreage would increase from 4,020 to 5,221 acres, waterfowl hunting from 1,722 to 3,432 acres (which meets the 40% "involute sanctuary" rule), upland game & migratory bird hunting remains at 1,995 acres, and turkey hunting is added, from zero to 3,729 acres. However, we would only issue no more than five turkey hunting permits, and the vast majority of the refuge would remain open to wildlife observation and other non-consumptive uses during the turkey hunting season. Furthermore, we are providing 3,185 acres of sanctuary area (no-disturbance areas) for waterfowl and other wildlife. Given the dominant role of the refuge in the Atlantic Flyway migration corridor, this closed area system was established to provide waterfowl with a network of resting and feeding areas and to disperse waterfowl hunting opportunities on the refuge. Specific descriptions of these sanctuary areas can be found later in this chapter 4 (under Waterfowl Hunting) and chapter 5 of the CCP/EIS, but are roughly Unit II, the lower half of Unit III, and Unit IV (map 4-17).

*Areas.* Increases in proposed hunting acreages will provide new hunting opportunities from current management; however, many of these proposed "new" hunting areas are currently open to some type of hunting or were previously open either under refuge management or private ownership. For example, Unit I is currently open for deer and upland game hunting and is now proposed to be open for waterfowl hunting—same land, but with a new opportunity. The refuge lands currently closed to hunting and proposed to be open for any type of hunting that are not currently being hunted for any species includes: an area located north of Prime Hook Road commonly referred to as Oak Island (deer only), an area north of Route 16 referred to as the Millman Tract (deer and turkey), an expanded area of the existing Jefferson Lofland Area and Headquarters Area (deer & turkey), an expanded area of the Unit III waterfowl hunt area (waterfowl only), and an area west of Petersfield Ditch in Unit IV. Of these areas, Oak Island was previously hunted under refuge management up until 1995 and the Millman Tract was hunted under private ownership up until the Service purchased it in 2001. The expanded areas of the Jefferson-Lofland Area, Headquarters Area, and nearly all of the proposed Unit III waterfowl hunt area were previously hunted under refuge management. No prior hunting of the area west of Petersfield Ditch is known.

*Administration.* Other changes to the hunting program would lower administrative burdens to staff resources and improve hunting quality. More specifically, these changes include:

- Eliminating permanent hunting structures.
- Allowing hunters to free roam in most areas that can tolerate pedestrians or navigation without adverse impacts on a first-come, first-served basis following State regulations.
- Adopting one-time seasonal permits for all hunting areas except lottery hunts.
- Enhancing youth and disabled hunting opportunities.
- Establishing seasonal closures to minimize wildlife disturbance and avoid conflicts with other uses.
- Establishing preseason lottery drawings for high demand deer, waterfowl, and turkey hunt areas.
- Eliminating daily standby permit drawings.
- Eliminating permit fees except for lottery hunts.

All persons hunting on the refuge would be required to obtain the necessary State licenses, tags, and stamps. Waterfowl hunters would be required to have a Federal migratory bird hunting and conservation stamp (duck stamp). Each hunter would also be required to have a signed copy of the current Prime Hook NWR hunting regulations leaflet, which would serve as the refuge hunting permit. In addition, hunters participating in the lottery hunts for deer, waterfowl, and turkey would also be required to have a daily permit issued in advance of the hunt date through a contractor. Hunters would not be required to check-in or check-out on the day of any hunt.

For most areas, hunter numbers would not be limited to a specific hunt location. Hunters would have the ability to free roam for deer, waterfowl, upland game, and turkey in designated areas on a first-come, first-served basis. Non-ambulatory disabled hunters would be required to hunt from designated hunt blinds and waterfowl hunters in the waterfowl lottery hunt area (Unit III) within a defined area around a designated blind site. For the Statewide youth hunts, all designated hunt areas would be open for waterfowl, deer, or turkey hunting on a first-come, first-served basis. We don't know the number of hunters who will participate in refuge hunting opportunities; however, we do anticipate a slight increase from current levels.

*Lottery.* Preseason lottery drawings are proposed for high demand areas, including the lottery deer hunt area (headquarters area), disabled deer and waterfowl hunt areas, lottery waterfowl hunting area (described previously in this section), and lottery turkey area to reduce hunter conflicts, lessen administration, and provide equal opportunity for all hunters. For daily drawings on opening days under current management, it is common to see more than 100 deer hunters show up for 32 available shotgun hunting opportunities and 80 waterfowl hunting parties (with up to 3 people per party) show up for 25 to 27 available hunt blinds. This illustrates how inefficient and frustrating it is for a group of hunters to get up early in the morning when they have less than a one in three chance of getting a hunting spot. As a national wildlife refuge, Prime Hook NWR will provide hunting opportunities through these preseason drawings for local, in-State, and

out-of-State hunters. Knowing in advance allows hunters to prepare, plan, and scout, which ultimately improves the quality of their hunting experience.

Preseason lottery drawings would be administered by a contracted company that will feature online and telephone services to collect hunter information and required fees (covered later in this section), and issue permits. These services would provide hunters with the ability to apply, pay for, and receive hunting permits in advance of the hunting dates. All fees must be paid prior to the issuance of a permit. Refuge staff would work with the contractor to provide the highest level of customer support.

For the preseason drawing for the lottery deer hunt area, hunters will be selected for a hunt date based on their date preferences. If selected, a limited number of hunters (no more than 30 hunters) would have access to the hunt area and may choose their hunting location on a first-come, first-served basis on the day of the hunt. For the lottery waterfowl hunt area and disabled deer and waterfowl hunt areas, hunters would be selected for a hunt date and hunting blind site based on their date preferences during the preseason drawing. Hunters could be picked for multiple dates. Only the first two days of each of the state's seasonal splits for waterfowl will be included in the preseason drawing for the disabled waterfowl area and will be first-come, first-serve thereafter. For the lottery waterfowl hunts, the selected hunter may take two additional people on that hunt day. Federal blind sites in addition to eight State blinds will be available each day. Everyone in the lottery drawing has an equal chance of being selected multiple times. The lottery turkey hunt may be administered by the Delaware Division of Fish and Wildlife.

For any vacant hunting opportunities not selected during the preseason lottery drawing, hunters would have the flexibility to go to the contractor's Web site at any time (24 hours a day) during the hunting season, view available hunt dates, and select and pay for these permits at any time. For those individuals who do not have computer access, customer representatives would be available by telephone during business hours on weekdays to assist. Hunters will be allowed to claim only one permit per day to prevent someone from claiming all available vacancies at one time. The licensing contractor would supply refuge staff with a list of permitted applicants. No daily standby lottery drawings would be conducted.

Deer stands and waterfowl blinds. Permanent hunting structures, such as deer hunting stands and duck hunting blinds, would be phased out over a 5-year period in all areas except the disabled hunting areas. We will limit the number of permits in the lottery hunt areas to minimize hunter conflict in areas historically known to attract large hunter numbers. In the case of deer hunting, the phasing out of permanent deer stands would require hunters to find a suitable hunting location within designated hunting areas through effective scouting. Use of portable deer climbing stands is recommended, but not required. In the case of waterfowl hunting, the phasing out of permanent waterfowl hunting blinds in the lottery hunt area will require hunters to provide their own means to camouflage themselves (boat blind, pop-up blind, etc.). Waterfowl hunters would be required to hunt within a defined area around a designated blind site (marker) in the lottery waterfowl hunt area. For any type of hunting, we feel that allowing hunters to scout and have the flexibility to adjust their hunting locations for weather conditions enhances the quality of their hunt. Maintenance mowing will no longer occur to provide trails to facilitate deer hunting. Some conflict among hunters over desired hunting locations is expected and we will continue to encourage proper hunting ethics.



Visitor safety at refuges is a high priority when developing compatible wildlife-dependent recreation programs, such as hunting; however, it is ultimately the responsibility of every hunter to be safe. An accident involving hunter safety results from either a lack of hunting ethics or a violation of hunting regulations. Use of portable deer climbing stands will be recommended but not required. For hunters who may be unable to climb trees using portable deer stands or who may wish to hunt from permanent deer stands or duck blinds, the state-owned Prime Hook Wildlife Area, which adjacent to the refuge, will continue to provide these opportunities. There are many areas on the Delmarva Peninsula, other than Prime Hook NWR, that offer public hunting opportunities in free-roam areas or from designated permanent structures. Additional information about free roam hunting and the use of deer stands and duck blinds on the refuge and on the Delmarva Peninsula can be found in the visitor services section in chapter 3 or the hunting management plan in appendix C.

*Disabled.* The refuge's proposed action offers opportunities for all disabled individuals. Areas will be reestablished for disabled hunters permanently confined to wheelchairs for movement to ensure that these individuals have opportunities for quality hunting experiences. Hunters confined to wheelchairs have limited mobility and there are no opportunities on the refuge to hunt unless refuge staff provides them with accessible infrastructure such as ground blinds and vehicular access to them. These hunters don't have the option to hunt other areas, as they are limited by the accessibility that the refuge provides them. Since there are no other reasonable accommodation options for non-ambulatory individuals to hunt in other areas of the Refuge, and there are sufficient circumstances affecting their only access provided to them to participate in the Refuge's hunting program, then this a justifiable reason to implement methods that will allow them access to the hunting program. Other disabled, yet ambulatory hunters are provided opportunities to hunt in the free roam areas, are not required in any fixed location, and may choose how far they are capable or willing to travel to hunt. Because these proposed changes do not exclude hunters with other types of disabilities from the Refuge's hunting program, these methods are in compliance with the intent of the Americans with Disabilities Act.

Non-ambulatory hunters have commented about their frustration with the current hunting system. The number of non-ambulatory hunters on the refuge has decreased since 2005, when access was granted to all individuals with any permanent disability (not just non-ambulatory hunters) to hunt in the disabled hunting area along with additional hunting days. Hunter success rates for deer have also decreased from an average of 32% from 2000-2005 to an average of 18% from 2005 to present.

*Youth hunting.* The Service proposes to enhance youth hunting opportunities by collaborating with State partners and NGO hunting organizations to develop hunter training programs that instruct beginning hunters in the knowledge and skills necessary to become responsible, respected individuals who strive to learn all they can about the species being hunted and to become knowledgeable in firearms safety, hunter ethics and wildlife conservation. The Service will also develop mentored hunting programs for both youth and adults and offer programs developed by NASP, or National Archery in the Schools program, to encourage family participation in archery shooting. Portions of any area open to hunting may be used to facilitate these mentored hunts and these areas will be temporarily closed to the general hunting public during those times.

Season dates, bag limits, and harvest methods for the hunting program at Prime Hook NWR will be consistent with State and Federal hunting frameworks and regulations. However, restrictions to these frameworks are listed below in the strategies and refuge-specific regulations to minimize user conflicts, address natural resource impacts, reduce administrative complexity, and ensure a quality hunting experience. The refuge manager will evaluate and make necessary adaptations to the hunting program to ensure that the refuge is meeting resource management objectives and continuing to offer quality experiences. Therefore, the refuge manager may extend or close hunting opportunities on the refuge within the established hunting seasons of the Delaware Division of Fish and Wildlife. The hunt program would apply to lands now a part of the refuge and lands added to the refuge in the future.

### Strategies

In addition to those strategies listed under Actions Common to all Alternatives affecting this program,

- Expand hunting opportunities for deer, waterfowl (including snow geese), upland game, webless migratory birds, and turkey (for details, refer to objectives 5.1a through 5.1d)
  - ✱ Support Presidential Executive Order 13443: Facilitation of Hunting Heritage and Wildlife Conservation
  - ✱ Adopt all State of Delaware hunting seasons and regulations, except as restricted in refuge-specific regulations
  - ✱ Provide additional hunting days and areas over current program
  - ✱ Put seasonal closures in effect for some areas to minimize wildlife disturbance and avoid conflicts with other public recreational programs
  - ✱ Provide high-quality hunting opportunities for turkey
- Adopt a one-time issued seasonal permit except for lottery hunts
  - ✱ Permit must be signed and in possession of hunter
  - ✱ Permits are non-transferable
- Remove all permit fees except for lottery hunts
  - ✱ Adjust the fee schedule for the lottery deer hunt area, lottery waterfowl hunt area, disabled deer and waterfowl hunt areas, and lottery turkey hunt area
- Increase the application fee for preseason lottery drawing to \$5/hunter
- Require a processing fee of \$2 to 3 per hunt for vacancies remaining after the preseason lottery drawing
- Adjusted permit fees are as follows:
  - ✱ Deer and turkey — \$10 per daily permit (per blind for non-ambulatory disabled hunters; application & permit fees for turkey hunting may be waived if the lottery drawing is administered by the State)

- ✱ Waterfowl—\$15 per daily permit per blind site
- ✱ The 50 percent discount on permit fees to interagency senior and access passholders does not apply
- ✱ Youth hunters age 15 years and younger must obtain a free seasonal permit. Only hunters aged 16 years and older can apply for or obtain a lottery hunt area permit.

*Permit fees.* The refuge collects boat ramp launching fees and hunting permit fees under the guidance of the Federal Lands Recreation Enhancement Act, 16 U.S.C. 6803(c), Consolidated Appropriations Act (PL 108-447). This law grants the Secretary authority to collect recreation fee revenues for public recreation. The Recreation Enhancement Act provides for a nationally consistent interagency program, additional on-the-ground improvements to visitor services sites across the nation, a new national pass for use across interagency federal recreational sites and services, and more public involvement in the program. The act replaces the Recreation Fee Demonstration Program and authorizes the Recreation Fee Program for 10 years through 2014. At least 80 percent of the funds raised from user fees on a particular refuge in this region stay at the refuge and are used to enhance visitor services and reduce the backlog of maintenance needs for recreation facilities. Recreation fees may not be used to pay for biological monitoring on Federal recreational lands and waters under the Endangered Species Act of 1973, for listed or candidate species or to pay for employee bonuses. The remaining 20 percent is sent to the region to be distributed to other refuges. In previous years, the refuge has received money from these regional funds for visitor services (appendix I).

This alternative reduces the administrative burden and minimizes the amount of staffing resources needed to conduct the hunt by 54 staff days and \$17,890. The benefit to the hunter is a reduction in the cost to hunt. Therefore, the refuge proposes to eliminate permit fees to hunt on the refuge except for the lottery hunts (see chapter 3 for discussion of fees in the current hunting program).

Fees will be required to manage the lottery hunts for deer, waterfowl, and turkey. Application and permit fees for turkey hunting may be waived if the lottery drawing is administered by the State. The Refuge Recreation Act requires that funds be available for the development, operation, and maintenance of the permitted forms of recreation. The proposed permit fee (\$10 for deer and turkey, \$15 for waterfowl), preseason application fee (\$5/hunter), and processing fee for permits acquired after the preseason drawing (\$2 to 3 per hunt) are the minimal amounts needed to offset the cost of facilitating the preseason drawings and managing the lottery hunts. Due to the uncertainty in the level of hunter participation with these new program changes, permit fees may need to be adjusted (increased or decreased), and therefore will be evaluated during the first 5 years of the CCP. Preseason lottery drawings will be administered by a contracted company that will collect information and required fees, conduct the drawing, and issue the permits. This may reduce our costs by more than \$3,000 and application and processing fees will be paid to the contractors for administering this permitting process. Refuge staff will work with the contractor to provide the highest level of customer support. Signs for posting hunting areas, trails, etc., will have an initial, one-time cost.

- Provide lottery hunts in the lottery waterfowl hunt area, lottery deer hunt area, disabled deer and waterfowl hunt areas, and lottery turkey hunt area. See discussion earlier in this section or objectives 5.1a, 5.1b, or 5.1d for more information.



- ✱ Conduct a preseason drawing to issue permits and collect fees for all available hunting dates. Drawings will be administered by a contracted company that will collect information and required fees, conduct the drawing, and issue the permits. Hunting opportunities for these lottery hunts will be available to hunters through the preseason drawing and throughout the season by going to the contractor's website or calling a customer service representative. For vacant hunting opportunities after the preseason drawing, hunters will be allowed to claim only one permit per day to avoid someone from claiming all available vacancies at one time. Hunters would have the option to forfeit their permit to the contractor if circumstances prevented them from hunting on that day, without compensation, i.e. no refunds, to make their reservation available to other hunters.
- ✱ Permits are non-transferable. No daily standby drawings will be conducted.
- ✱ Permit and application fees apply.
- ✱ Preseason drawings for turkey hunting may be conducted by the Delaware Division of Fish and Wildlife and if so, application and permit fees may be waived.
- Enhance disabled hunting opportunities, particularly for those permanently confined to wheelchairs (see objectives 5.1a and 5.1b for more information).
- Enhance youth hunting opportunities
  - ✱ Collaborate with State partners and NGO hunting organizations to develop hunter training programs that instruct beginning hunters in the knowledge and skills necessary to become responsible, respected individuals who strive to learn all they can about the species being hunted and to become knowledgeable in firearms safety, hunter ethics and wildlife conservation.
  - ✱ Develop mentored hunting programs for both youth and adults and offer programs developed by NASP, or National Archery in the Schools program, to encourage family participation in archery shooting.
  - ✱ Portions of any area open to hunting may be used to facilitate these mentored hunts and these areas will be temporarily closed to the general hunting public during those times.
- Seasonal closures apply to non-consumptive users during the hunting season, which is typically a slower period of use due to weather conditions, and are highlighted below:
  - ✱ Deep Branch Road Trail (includes Goose and Flaxhole Ponds; Unit III), Eastern Prime Hook Creek (from Foord's Landing to headquarter ramp) (Unit III), and hiking trail on Fowler Beach Road (southside of Unit II): Closed every day from September 1 through March 15. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order or turkey hunting. If and when the photography blind is available on the southside of Fowler Beach Road, this portion of the trail will be open year round and open every Sunday during the hunting season.
  - ✱ Headquarters area (includes Turkle and Fleetwood Ponds) (Unit III): Closed only for a maximum of two days for deer hunts and portions may be closed for turkey hunts.

- ✱ Island Farm Area in Unit IV (includes trail overlooking Vergie's Pond): Closed from the Monday before Thanksgiving through March 15. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order.
- ✱ Hiking trails on Fowler Beach Road (Unit I), Prime Hook Road (Unit III), and Slaughter Beach Road and Slaughter Canal (Unit I): Open only on Sundays from September 1 through the deer and waterfowl hunting seasons, which typically end in February. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order or turkey hunting.
- Add a new full-time law enforcement officer to enforce regulations
- Improve access at boat launching areas
  - ✱ Enhance boat ramp access on Fowler Beach Road for access to Slaughter Canal.
  - ✱ Work with private landowners to improve access to western end of Prime Hook Creek.
  - ✱ Within 5 years of the plan, open a boat ramp for access to Prime Hook Creek at Foord's Landing.
- General regulations for all hunting programs
  - ✱ Hunters may not be on the refuge any earlier than two hours before shooting time.
  - ✱ Non-toxic shot is required for all hunting except lead slugs are permitted for deer or fox hunting.
  - ✱ Individuals assisting non-ambulatory disabled deer hunters are not permitted to hunt; however, up to two individuals may hunt while assisting a non-ambulatory disabled waterfowl hunter. All disabled hunters are required to have an assistant.
  - ✱ Designate Slaughter Canal as a slow no wake zone.
  - ✱ Digging for any reason is prohibited.

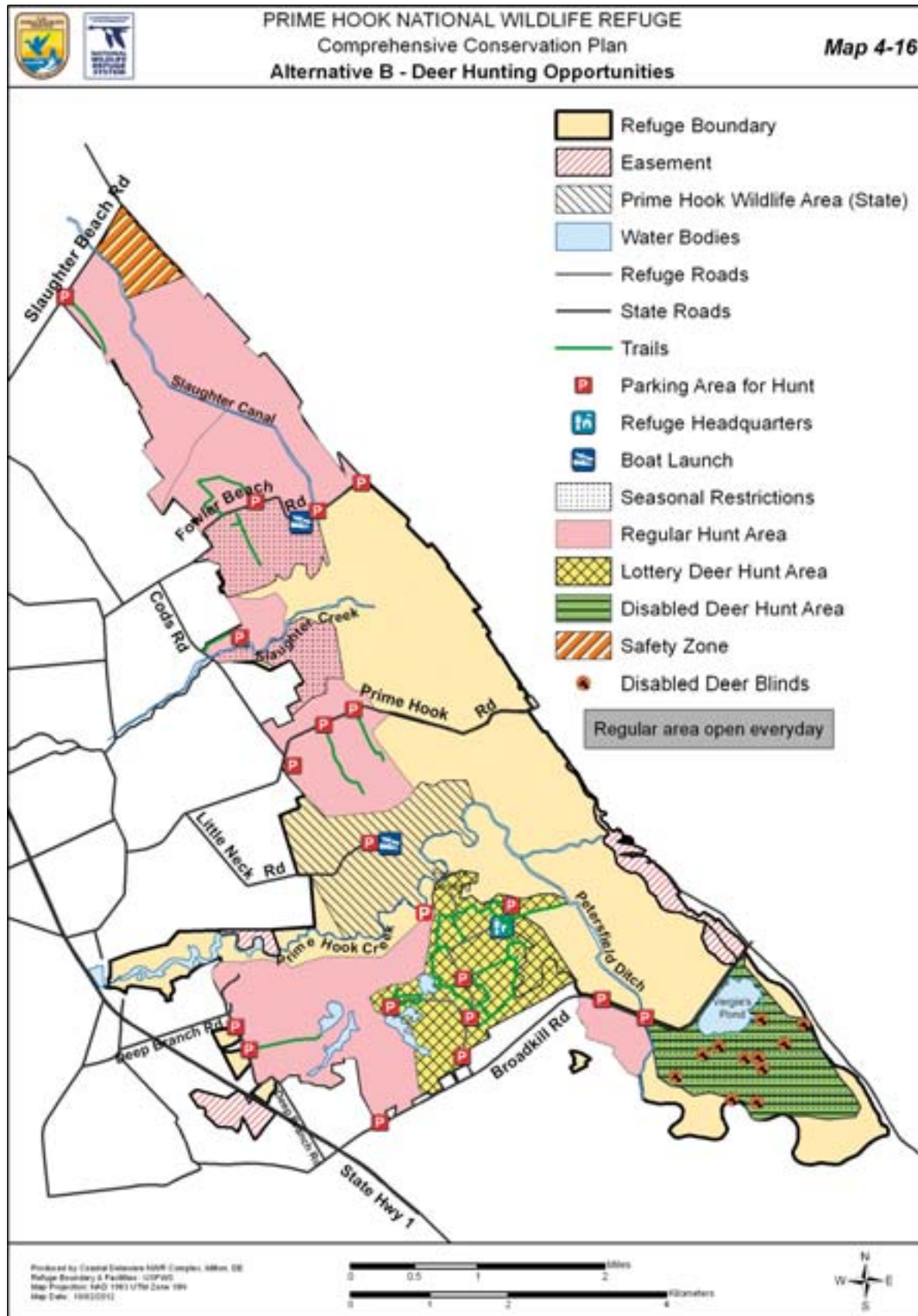
**Objective 5.1a White-Tailed Deer Hunting**

Provide high-quality hunting opportunities for white-tailed deer.

**Rationale**

In addition to the information presented under objective 5.1, deer hunting would be increased to include an additional 1,201 acres beyond current management for a total of 5,221 acres. We would open these acres for archery (to include the use of crossbows), muzzleloader, or shotgun (to include the use of handguns) hunting, where appropriate, and would phase out permanent deer stands. Seasonal closures would occur not only to protect wildlife, but also to minimize conflicts between different hunting activities and other non-consumptive recreational uses (e.g., minimize conflict with anglers on Prime Hook Creek and close hunting in late November in designated areas to minimize bald eagle and waterfowl disturbance). The disabled hunting areas in Unit IV under this alternative would limit access to individuals who are permanently confined to a wheelchair for movement. Map 4-16 depicts deer hunting opportunities and infrastructure.

Map 4-16. Deer hunting opportunities under alternative B



### Strategies

In addition to objective 5.1 strategies under alternative B:

- Hunting will be on a first-come, first-served basis except for lottery hunts.
- Check in and check out by hunters would not be required for any deer hunt.
- Expand deer hunting opportunities from 4,020 acres to 5,221 acres, an increase of 1,201 acres (Map 4-16).
  - ✱ The refuge has adopted State hunting regulations and seasons for the regular deer hunt area with the following restrictions:
    - \* No access by boat from Slaughter Creek on Cods Road
  - ✱ There is no infrastructure to support boat launching.
  - ✱ Seasonal closures to deer hunting from the Monday before Thanksgiving through March 15 will occur on the designated area north of Prime Hook Beach Road (Oak Island) and south of Fowler Beach Road to minimize disturbance to waterfowl and nesting bald eagles. The disabled deer hunt area in the Island Farm will be closed following the November shotgun season to minimize wildlife disturbance.
- Phase out permanent deer hunting stands over a 5-year period or when they become unsafe, whichever comes first.
  - ✱ Hunters may free roam in hunting areas except in the disabled deer hunt area.
  - ✱ Portable stands are permitted.
  - ✱ Eliminate maintenance mowing except for disabled hunt areas.
- Hunters will not be required to report their harvest data to the refuge. Refuge staff will collect harvest information from the existing reporting system administered by the State Delaware Division of Fish and Wildlife.
- Enhance hunting opportunities for individuals with disabilities, particularly for those permanently confined to wheelchairs.
  - ✱ Reestablish areas for non-ambulatory disabled hunters permanently confined to wheelchairs in a designated area in Unit IV.
  - ✱ Provide a limited number of hunting days during the early muzzleloader hunting season, the Statewide non-ambulatory hunt in November, and the early shotgun hunting seasons in the disabled hunt area to minimize deer disturbance and maximize quality hunting experience. A total of 11 ground blinds are currently available and required. Additional sites in this area may be provided.
  - ✱ The refuge may evaluate the regular deer hunting area for the potential to incorporate hunting opportunities for non-ambulatory hunters.
- Provide lottery hunts in the lottery deer hunt area and the disabled deer hunt area for a limited number of days during the firearms deer hunting seasons.

- ✱ A limited number of permits (no more than 30 for the lottery deer hunt area) will be issued for each hunt day to reduce conflict and maintain quality hunting experiences.
- ✱ Hunters may hunt anywhere within the lottery deer hunt area on a first-come, first-served basis. Hunters in the disabled deer hunt area must hunt from one of 11 ground blinds in the area.
- ✱ The areas will be gated to minimize conflict with the general public and times will be designated for ingress and egress to the area.
- The refuge will participate in the Statewide non-ambulatory deer hunt. The lottery deer hunt area will not be open for this hunt.
- General regulations for deer hunting.
  - ✱ Enhanced opportunities for scouting will be allowed 2 weeks before the start of archery season and throughout the deer hunting season.
  - ✱ Hunters must be out of the hunting areas one and one-half hours after the evening shooting time.

**Objective 5.1b Waterfowl Hunting**

Provide high-quality hunting opportunities for waterfowl.

**Rationale**

In addition to the information presented under objective 5.1, waterfowl hunting would be increased to include an additional 1,710 acres from current management for a total of 3,432 acres. Seasonal closures would occur to protect wildlife and minimize conflicts between different hunting activities or other non-consumptive recreational uses (e.g., close hunting in late November in designated areas to minimize bald eagle and waterfowl disturbance). We would phase-out permanent waterfowl hunting blinds. In all hunt areas, hunting is proposed to remain at four days per week and to cease at 3pm to minimize wildlife disturbance and provide quality hunting experiences. The disabled hunting areas in Unit IV under this alternative would limit access to individuals who are permanently confined to a wheelchair for movement.

The addition of new free-roam waterfowl hunting areas in salt marsh habitats in Unit I will provide quality opportunities, particularly when refuge impoundments freeze. Sanctuaries totaling 3,185 acres are provided as disturbance free areas for wildlife where no recreational activity is permitted. Map 4-17 depicts waterfowl hunting opportunities and infrastructure. In the lottery waterfowl area, the Service limits the number of hunting parties through the use of designated blind sites. In free roam areas, hunters are limited by the available access for parking and boat launching and by hunters thinning themselves out as a way to minimize conflict with other hunting parties.

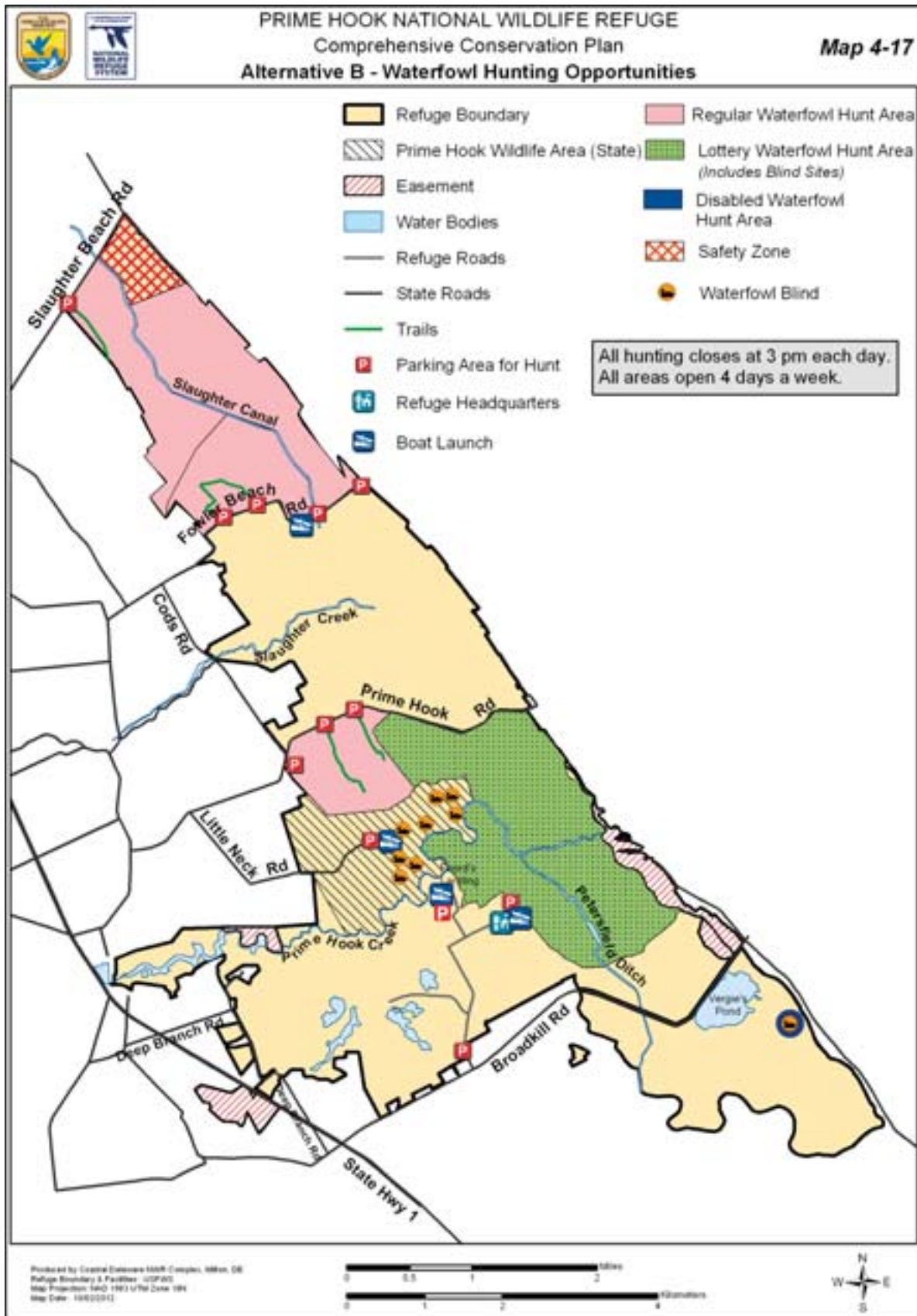
**Strategies**

In addition to objective 5.1 strategies under alternative B,

- Create waterfowl sanctuaries (disturbance free areas) in Unit II (approximately 1,800 acres), Unit III (approximately 390 acres), and Unit IV (approximately 995 acres)
  - ✱ The Unit II impoundment area will be closed annually to all public use.



Map 4-17. Waterfowl hunting opportunities under alternative B



- \* Except for the disabled waterfowl hunt area (approximately 25 acres), most of Unit IV will be closed from the Monday before Thanksgiving through March 15 to all public use.
- \* Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order or for wild turkey.

To support waterfowl conservation efforts, the refuge has designated about 3,185 acres as waterfowl sanctuaries that will be closed to hunting and other recreational use on a seasonal or annual basis. These sanctuaries lie in Unit II (1,800 acres), the southern half of Unit III (390 acres), and most of Unit IV (995 acres) and provide resting and feeding habitat for waterfowl to concentrate rather than dispersing throughout the refuge. These sanctuaries function to provide migrating waterfowl with a more balanced and effective network of feeding and resting areas, to minimize disturbance to feeding and resting waterfowl, and to provide waterfowl hunters with more equitable hunting opportunities throughout the refuge.

- Establish hunter spacing limits
  - \* Reduce hunter competition and improve hunting quality
- Managed hunts in the lottery waterfowl hunt area will provide opportunities for a limited number of hunters and allow them to choose their hunting location
- Expanded hunting areas will provide greater opportunity for hunters
- Expand hunting opportunities from 1,722 acres to 3,432 acres or 40 percent of the refuge to include new hunting opportunities in Unit I and III. We must follow the guidelines of the 40 percent rule. All areas approved for purchase by the Migratory Bird Conservation Commission prior to 1978 are inviolate sanctuaries and thus subject to the 40% limitation, meaning only 40 percent of the area or areas can be open to migratory bird hunting. In 1978, the Fish and Wildlife Improvement Act amended Section 6 of the Refuge Administration Act of 1966 “to provide the opening of all or any portion of an inviolate sanctuary to the taking of migratory birds if the taking is determined to be beneficial to the species.” In addition, the act amended Section 5 of the Migratory Bird Conservation Act to include the provision that areas could be acquired for other management purposes.
  - \* The refuge has adopted State hunting regulations and seasons with the following restrictions:
    - \* Hunting will be on a first-come, first-served basis that includes jump shooting (except for lottery hunts and disabled hunts).
    - \* In all waterfowl hunting areas, hunting is permitted four days per week until 3pm during the state waterfowl hunting seasons (except everyday during the snow goose conservation order).
    - \* Check-in and check-out by hunters would not be required for any waterfowl hunt.
- Phase-out permanent waterfowl hunting blinds over a 5-year period or when they become unsafe; whichever comes first.
  - \* Hunters may free roam in the regular waterfowl hunting areas (except the lottery waterfowl hunt area and disabled waterfowl hunt area).

- ✱ Hunters would be required to hunt from hunting blind site areas in the lottery waterfowl hunt area and disabled waterfowl hunt area.
- ✱ Blind site areas are subject to change due to changing habitat conditions, to improve the quality of hunting, or for safety considerations.
- Hunters will not be required to report their harvest data to the refuge. Harvest information will be collected through the harvest information program system.
- Enhance hunting opportunities for individuals with disabilities, particularly for those permanently confined to wheelchairs.
  - ✱ Reestablish areas for nonambulatory disabled hunters permanently confined to wheelchairs in a designated area in Unit IV.
  - ✱ One disabled, wheelchair accessible, and camouflaged waterfowl hunting blind is available.
- Provide lottery hunts in the lottery waterfowl hunt area and disabled waterfowl hunt area.
  - ✱ Through a preseason lottery drawing, hunters must choose their hunt dates and blind site locations from among the designated blind locations.
  - ✱ Only the first two days of each of the state's seasonal hunting splits for waterfowl will be included in the preseason drawing for the disabled waterfowl area and will be first-come, first-serve thereafter.
  - ✱ Within 5 years of CCP signing, we will open boat ramp access at Foord's Landing for all public recreational access.
- The refuge will participate in all State of Delaware waterfowl hunting seasons unless otherwise restricted. This includes the duck seasons, early teal season, youth waterfowl hunts, resident Canada goose season, and snow goose season (early and snow goose conservation order).
  - ✱ Provide hunting opportunities during the resident Canada goose season and the early teal season in all areas designated as open to waterfowl hunting. In the lottery waterfowl hunt area, all regulations apply as stated in earlier strategies of this objective, except hunting will be on a first-come, first-serve basis and no preseason drawing will occur. In the regular waterfowl area, all regulations apply as stated in earlier strategies of this objective.
  - ✱ Institute lethal snow goose control and provide hunting opportunities during the State of Delaware's snow goose conservation order season in all four management units throughout the refuge on a first-come, first-served basis everyday of the season during legal shooting hours.
    - ✱ The light goose conservation order is an action implemented under the final environmental impact statement on the management of light geese (USFWS 2007a) to help reduce overabundant greater snow goose populations. Although the refuge has been closed recently to late snow goose hunting, the conservation order presents an opportunity to reopen to snow goose hunting during the late season in coordination with the State Delaware Division of Fish and Wildlife. This will be pursued as an option whenever the conservation order is in effect. All special harvest methods permitted by the conservation order apply.

- \* Hunting is not permitted in upland areas.

- \* The youth hunts will occur in all designated hunting areas on a first-come, first-served basis.

- \* In the lottery hunt area and disabled waterfowl hunt area, snow geese may only be taken when already open for duck hunting or during the snow goose conservation order.

- General information for waterfowl hunting

- \* Enhanced opportunities for scouting will be allowed on Sundays immediately prior to each of the duck season splits.

- \* Hunters must be out of the hunting areas by 4:00 pm.

**Objective 5.1c Upland Game and Webless Migratory Bird Hunting**

Provide high-quality hunting opportunities for upland game (rabbit, quail, pheasant, and red fox) and webless migratory birds (mourning dove, snipe, and woodcock).

**Rationale**

In addition to the information presented under objective 5.1, upland game and webless migratory bird hunting will remain the same at 1,995 acres. However, the dove hunting acres will be decreased by 110 acres. The hunting of red fox will assist State management efforts in reducing the incidence of mange outbreaks to maintain a healthy population and reduce the predatory impact of this species on migrating and breeding birds, particularly State and federally endangered or threatened species. Map 4-18 depicts upland game and webless migratory bird hunting opportunities and infrastructure.

**Strategies**

In addition to objective 5.1 strategies under alternative B:

- Continue upland game and webless migratory bird hunting opportunities on 1,995 acres (110 of the total acres would not be open to dove hunting). See objective 5.1b for explanation of 40 percent migratory bird hunting rule.

- \* The refuge has adopted State hunting regulations and seasons for the upland game hunting area with the following restrictions:

- \* Provide new hunting opportunities for red fox.

- ◆ Hunting of red fox is permitted only when concurrently hunting deer and is only permitted in areas open to deer hunting.

- ◆ Chase hunting is prohibited.

- ◆ Rimfire or centerfire rifles are prohibited.

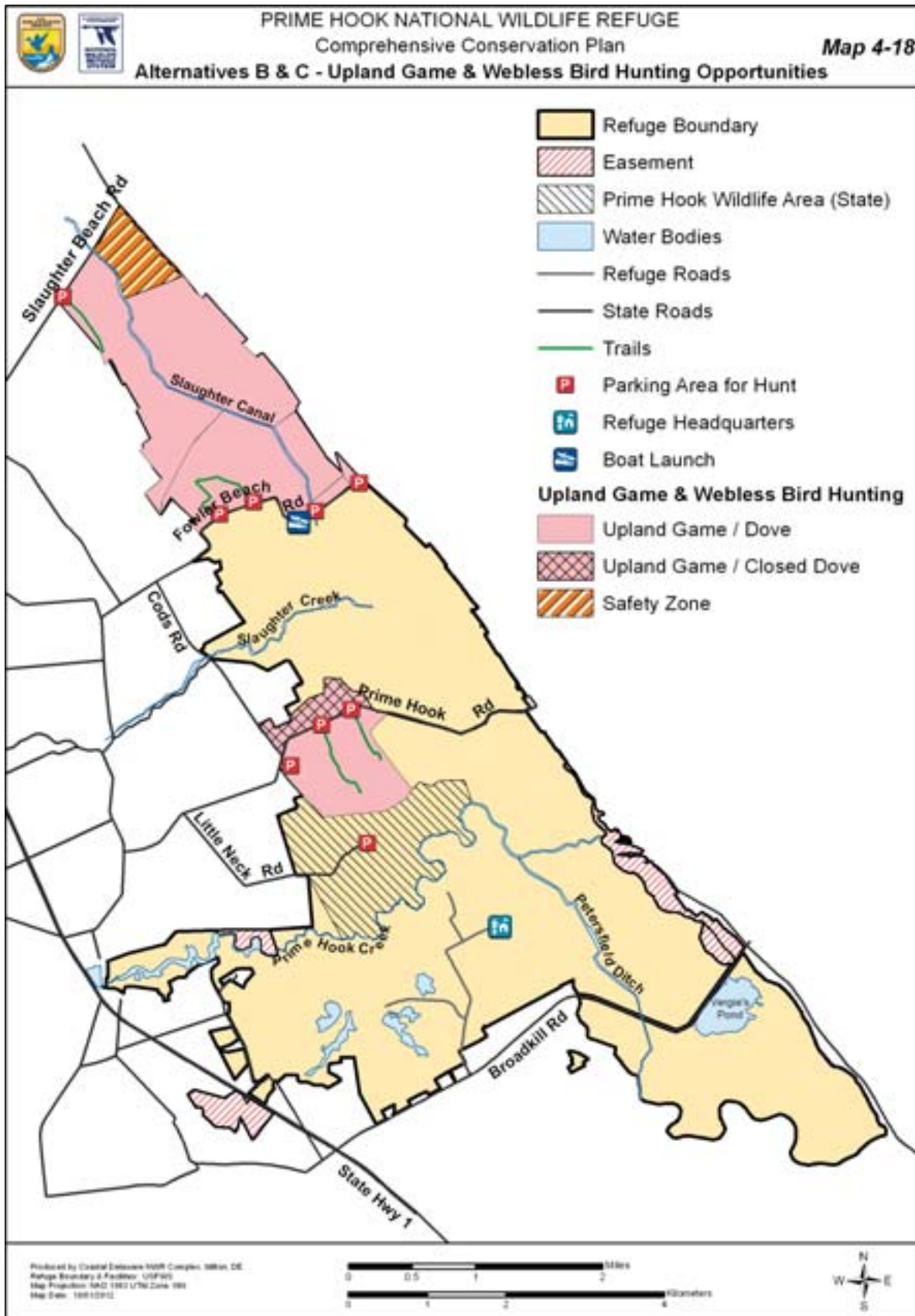
- \* Dove hunting is open in the upland game hunting area except the designated area north of Prime Hook Beach Road.

- \* Hunters will not be required to report their harvest data to the refuge.

- \* Hunting will be on a first-come, first-served basis. Check-in and check-out by hunters would not be required for any upland game and webless migratory bird hunt.



Map 4-18. Upland game and webless migratory bird hunting opportunities under alternative B





- ◆ Hunters must be out of the hunting areas one-half hour after legal shooting hours.

**Objective 5.1d Wild Turkey Hunting**

Provide high-quality hunting opportunities for turkey.

**Rationale**

Wild turkey is a resident game species that is managed by DNREC's Division of Fish and Wildlife. Prime Hook NWR falls within Zone 9 of DNREC's Wild Turkey Management Regions. Zone 9, which includes the state-owned Prime Hook Wildlife Area that is adjacent to the refuge, is currently open during the spring turkey hunting season. To ensure a sustainable harvest of the state's turkey population, DNREC biologists track their health, distribution and reproductive success. Current efforts include a volunteer-based survey used to generate an index of annual turkey productivity and recruitment, monitoring turkey harvest and hunter efforts, tracking turkeys with radio transmitters to evaluate their reproductive ecology, habitat use, and survival, and evaluating the genetic diversity of turkeys.

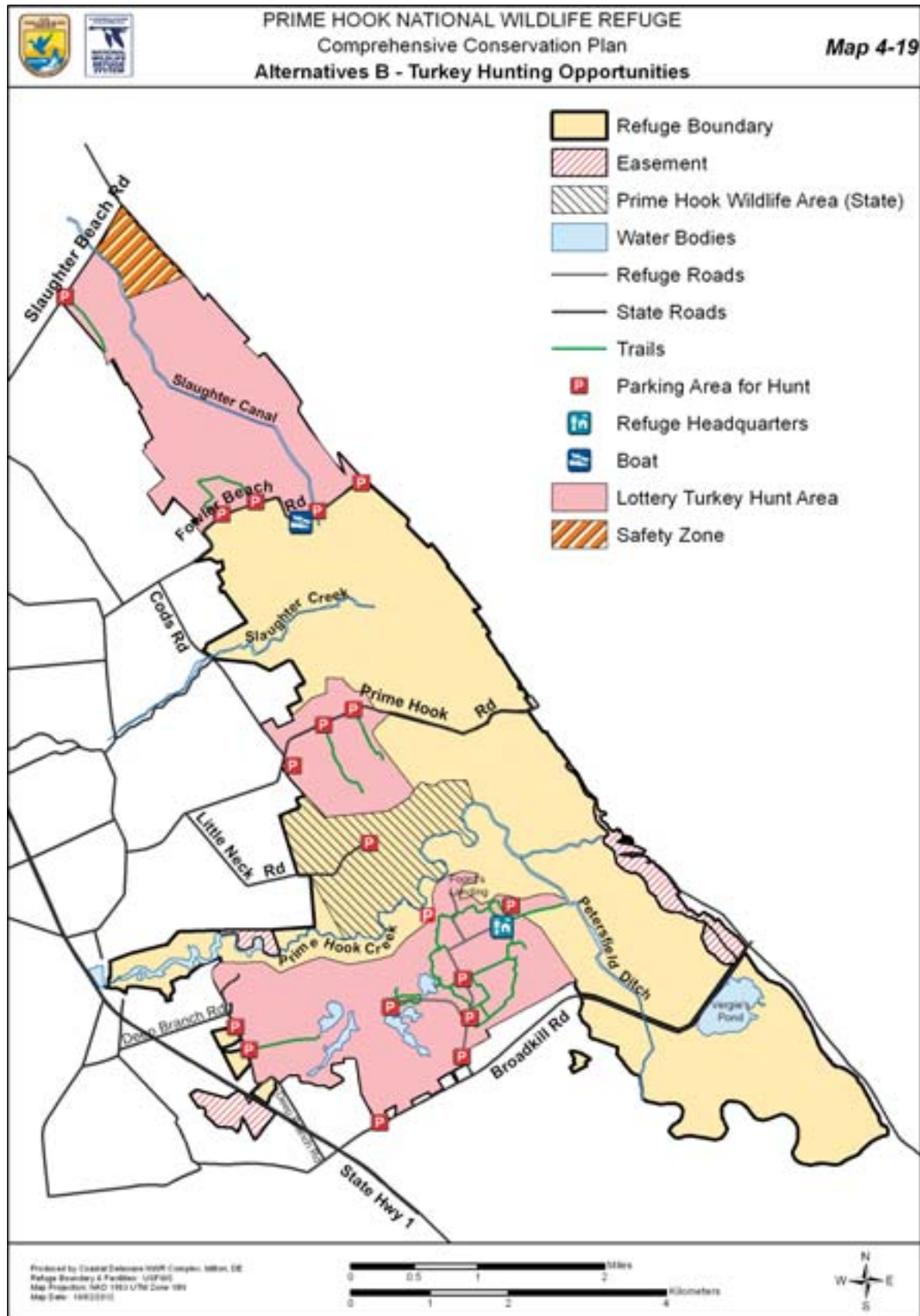
We would provide new opportunities for hunting wild turkey on 3,729 acres for a limited number of hunters. We recognize turkey hunting as a traditional outdoor pastime. When managed responsibly, it can instill a unique appreciation of wildlife, their behavior, and their habitat needs. Turkey hunting was initiated on the refuge in 1993. After two seasons of hunting and only one harvested turkey, the opportunity was discontinued. In recent years, hunter and staff observations indicate that a huntable population of turkeys may exist on the refuge, particularly in the headquarters area and in areas near Deep Branch Road. Limited opportunities exist on public lands to hunt turkey and the refuge may contribute to providing additional opportunities. Seasonal closures and time and space zoning among user groups may change on an annual basis to adapt to changing State of Delaware hunting seasons, federal or state regulations, user conflicts, or impacts to natural resources. Map 4-19 depicts turkey hunting opportunities and infrastructure.

**Strategies**

In addition to objective 5.1 strategies under alternative B,

- Collaborate with the Delaware Division of Fish and Wildlife to evaluate the status of the wild turkey population on the refuge. Hunting will be permitted if State and refuge personnel determine that the turkey population in the area is sufficient to support hunting on the refuge.
  - ✱ Consult with the Delaware Division of Fish and Wildlife on an annual basis to determine the status of the turkey population and whether to allow turkey hunting on the refuge.
- Hunting of turkey will be permitted to a limited number of hunters (no more than five) in the designated lottery turkey hunt area in accordance with State hunting regulations and seasons.
  - ✱ Provide lottery hunts in the lottery turkey hunt area, which may be administered by the Delaware Division of Fish and Wildlife and if so, application and permit fees may be waived.
  - ✱ Conduct a preseason lottery drawing. No daily standby drawings will be conducted.

Map 4-19. Turkey hunting opportunities under alternative B



- ✱ During hunts, all public access will be closed in designated hunt areas during legal hunting hours.
- ✱ Participate in the statewide youth/non-ambulatory disabled turkey hunt.
- ✱ The number of permitted hunters may be adjusted (increased or decreased) based on changes in turkey population data.
- ✱ Enhanced opportunities for scouting will be allowed during designated dates and times.

**Objective 5.2 Wildlife Observation and Photography**

Provide high-quality wildlife observation and photography opportunities.

**Rationale**

To improve the refuge's wildlife observation and photography program, we evaluated wildlife observation and photography on the refuge, incorporated the opinions of birders, nature photographers, hikers, etc., and developed this plan in collaboration with our State partners in the Delaware Division of Fish and Wildlife. These program changes, which reflect a diversity of preferences and opportunities for wildlife observation and photography, strive to meet the guiding principles for a quality refuge wildlife observation and photography program identified in Service policy 605 FW 4 and 5. They also support the Refuge System Improvement Act of 1997, which identifies wildlife observation and photography as priority wildlife-dependent recreational opportunities that should be offered on refuges when deemed to be compatible.

Maintaining quality infrastructure and providing new facilities would enhance visitor opportunities to view the relationships among resource management, wildlife, habitat, and people. Opportunities for wildlife observation and photography have been expanded to include seven new trails totaling 3.7 miles throughout the refuge in all four management units on existing maintained trails or interior refuge roads, bringing the total number of trails to 14 and 9.9 miles. Other expanded opportunities include the developing interpretive material highlighting wildlife viewing and photography areas along adjacent State roads, improvements to roadside viewing areas along Prime Hook Beach Road and Broadkill Beach Road, constructing a photography blind along a restored wetland area, and enhancing opportunities for disabled individuals.

We propose limited seasonal closures in areas of the refuge that provide opportunities for wildlife observation and photography. One closure that is different from alternative A is the closure of the eastern portion of Prime Hook Creek from September 1 through March 15. We will continue to allow year-round access to the western 4 miles of Prime Hook Creek for visitors engaged in uses such as wildlife observation, wildlife photography, and fishing. Additional seasonal closures may apply until the second Saturday in May for hunting during the snow goose conservation order or turkey hunting.

At first glance, these seasonal closures give the appearance that opportunities for wildlife observation and photography are being significantly reduced or totally eliminated for over eight months during the proposed expanded hunting activities. To the contrary, the majority of the refuge would remain open to wildlife observation and other non-consumptive uses and provide more opportunities and open areas than under current management. The Headquarters area remains available 363 days a year for non-consumptive uses, but portions may be closed for turkey hunting. All other areas except for the Deep Branch Trail, Fowler Beach Road trail (southside), and Prime Hook Creek are open on every Sunday during the hunting seasons. The Deep Branch

Trail, the Fowler Beach Road trail (southside), and Prime Hook Creek are open with seasonal closures of every day from September 1 through March 15 and if necessary during the snow goose conservation order or turkey hunting seasons. If and when the photography blind is available on the southside of Fowler Beach Road, this portion of the trail will be open year round and open every Sunday during the hunting season. The majority of the hunting will occur during the main hunting season, which typically runs for five months from September through January, with additional hunting opportunities for rabbit through the end of February. The actual season length, including starting and ending dates, will vary annually, and the actual number of huntable days will vary annually as well. For example, the Federal framework only permits a maximum of 60 days hunted during the waterfowl season, but because of additional restrictions imposed by the refuge (e.g., only allowing waterfowl hunting 4 days a week rather than 6 days a week), the regular duck season on the refuge will actually be approximately 40 days, and only to 3 p.m. on those days. Hunting during the snow goose conservation order, which will occur for 2 ½ months from late January through mid-April, will take place mostly in the wetland areas, leaving the upland areas open to other uses. This hunt is not anticipated to bring large numbers of hunters, but is beneficial to the species and other wildlife due to overpopulation. With five or fewer turkey hunting permits issued in April and May, a vast majority of the refuge would still remain open to wildlife observation and other non-consumptive uses.

During public involvement for the CCP, some questioned why hunters are often allowed to go into some areas that the non-consumptive public is not allowed. The time of year, the numbers of people, and the opportunities afforded at other areas, and how these relate to habitat and wildlife, all go into our consideration. Since the number of hunters is significantly smaller than the number of people who observe wildlife at the refuge, the amount of people on the area is easier to plan, control and monitor. The relatively smaller number of hunters also do not have the same trampling effects on vegetation, especially from September through January, than the unregulated general public could create. As far as clearing new areas for wildlife viewing, we feel as though removing habitat for the sole purpose of increasing wildlife viewing opportunities conflicts with the Service mission and refuge's purposes because the reduction of habitat may decrease the biological diversity and the integrity of the area. Removing habitat fragments the landscape and may reduce the potential viewing of many species that are area-dependent or have specific habitat requirements. We also feel that the refuge has sufficient parking areas, hardtop roads, foot trails, and observation towers available for physical and visual access to wildlife. Refuge staff will continue to evaluate the wildlife observation and photography program on an annual basis and modify it, as warranted, given new biological or visitor data. This plan reflects a balanced and measured increase in facilities and opportunities for wildlife observation and photography, while continuing to meet fish and wildlife protection and management responsibilities. Map 4-15 depicts wildlife observation and photography opportunities and infrastructure.

### **Strategies**

In addition to those strategies listed under Actions Common to all Alternatives affecting this program,

- Expand or enhance wildlife observation and photography opportunities by creating seven new trails totaling 3.7 miles using existing and already maintained trail and road networks. The total number of refuge trails becomes 14 with 9.9 miles.

- ✱ Except as noted below, access to all areas is provided everyday throughout the year from one-half hour before sunrise to one-half hour after sunset. Seasonal restrictions in areas where hunting occurs will allow access on every Sunday from September 1 through the deer and waterfowl hunting seasons, which typically end in February. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order or turkey hunting. Due to the low number of permitted turkey hunters afield and that snow goose hunters will be hunting in wetland areas, a vast majority of the refuge would still remain open to wildlife observation and other non-consumptive uses.

- ✱ Unit I—Slaughter Beach Road (Slaughter Woods) Trail (NEW)

- ◆ Create a one to two space parking lot and use the existing interior road as the trail. The location of the existing parking lot will not be used for this trail because it creates safety issues by requiring visitors to walk along the roadside.
- ◆ Opportunities available year round but only open every Sunday during the hunting season

- ✱ Unit I—Slaughter Canal (existing, but previously promoted for only fishing)

- ◆ Opportunities available year round but only open every Sunday during the hunting season

- ✱ Unit I—Willow Oak Trail (NEW)

- ◆ Located north of Fowler Beach Road, access will be provided using the existing trail network
- ◆ Opportunities available year round but only open every Sunday during the hunting season

- ✱ Units I & II—Fowler Beach (existing)

- ◆ Open year round with seasonal closures of designated beach dunes and overwash areas from March 1 through September 1 (for more information, refer to “Actions Common to All Alternatives”).
- ◆ Adaptive management is necessary if Fowler Beach Road, from Slaughter Canal to its terminus at the Delaware Bay, is abandoned by DELDOT and donated to the Service. If, upon DelDOT's removal of the existing layer of asphalt overlying unconsolidated fill, the walking trail will serve its purpose of public use until marsh vegetation and hydrologic function reclaim the trail and the formally bisected habitat (Units I & II) function as one unit. When conditions are deemed unsafe, access will not be permitted to Fowler Beach for public use opportunities such as wildlife observation, wildlife photography, and fishing.

- ✱ Unit II—Fowlers South Trail (NEW)

- ◆ Use existing interior road to provide access
- ◆ Provide parking area at existing gate on north side of Fowler Road
- ◆ Explore the possibility of providing access to seasonal wetland (if developed) with a wheelchair-accessible photography blind



- ◆ Open with a seasonal closure of every day from September 1 through March 15 and if necessary during the during the snow goose conservation order or turkey hunting seasons.
- ✧ If and when the photography blind is available, the portion of this trail from the trailhead to the photography blind will be open year round and open every Sunday during the hunting season.
- \* Unit III—Prime Hook South Trails (NEW)
  - ◆ Use existing parking lots and interior roads to provide access
  - ◆ Increase nesting boxes for tree swallows and bluebirds through volunteer support where the public may observe wildlife activity
  - ◆ Opportunities available year round but only open every Sunday during the hunting season
- \* Unit III—Deep Branch Road (Goose Pond) Trails (NEW)
  - ◆ Using the existing hunting parking areas and interior road to provide access
  - ◆ Open with a seasonal closure of every day from September 1 through March 15 and if necessary during the snow goose conservation order or turkey hunting seasons.
- \* Unit III—Refuge headquarters area (existing with NEW trail)
  - ◆ Improve the trail base for the dike portion of the Blue Goose Trail
  - ◆ Create the Broadkill Dike Trail (NEW)
    - ✧ Open a portion of the existing interior road near the deer check station building to provide additional parking and wildlife observation opportunity.
  - ◆ Open 363 days a year (closed for two deer hunts) and portions may be closed for turkey hunts.
- \* Unit III—Prime Hook Creek (includes mainstem of creek & Headquarters Canal; existing)
  - ◆ Open with a seasonal closure of Eastern Prime Hook Creek (from Foord's Landing to headquarters ramp): Closed every day from September 1 through March 15. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order.
- \* Unit IV—South of Broadkill Beach Road (NEW; existing but not currently open)
  - ◆ Reevaluate the trail and observation platform overlooking Vergie's Pond
    - ✧ Option 1: Keep the existing trail and create a parking lot at the existing trail head.

- ✧ Option 2: Abandon and remove the existing walkway. Reroute the trail to the east and construct a smaller, less intrusive boardwalk and trail to the firebreak and existing tower and a three to five space parking lot on the existing high ground.

- ◆ Open with a seasonal closure from the Monday before Thanksgiving through March 15 and if necessary during the during the snow goose conservation order hunting season.

- \* All Units— Interpretive auto tour route

- ◆ Create an interpretive brochure outlining the wildlife viewing areas, trails, pull-offs, etc., that can be accessed from public roads and highways

- ◆ Investigate the potential to use advanced technology (radio, compact disc, cell phones, or downloadable programming) to provide visitors with interpretive material about the refuge related to wildlife observation and photography.

- ◆ Open year round

- ☼ Improve access at boat launching areas.

- \* Upgrade boat ramp access on Fowler Beach Road for access to Slaughter Canal

- ◆ Designate Slaughter Canal a no wake zone.

- \* Work with private landowners to improve access to western end of Prime Hook Creek

- \* Within 5 years of the plan, open a boat ramp at Foord's Landing for access to Prime Hook Creek

- ◆ Provide visitor opportunities to canoe or fish for 3 miles in a loop, eliminating the need for two vehicles due to close proximity of the launch area at the refuge office.

- ☼ Eliminate boat launching fees at all refuge boat ramps.

- \* Maintenance to boat ramps and parking areas will be funded through deferred maintenance projects

- ☼ Add a new full-time law enforcement officer to enforce regulations.

- ☼ Within 5 years of the CCP approval, develop a visitor services plan for the refuge.

### **Objective 5.3 Recreational Fresh and Saltwater Fishing and Crabbing**

Provide high-quality fishing and crabbing opportunities.

#### **Rationale**

To improve the refuge's recreational fishing and crabbing program, we evaluated fishing on the refuge, incorporated the opinions of anglers and crabbers, and developed this plan in collaboration with our State partners in the Delaware Division of Fish and Wildlife. These program changes, which reflect a diversity of fishing preferences and opportunities, strive to meet the guiding principles for

a quality refuge fishing program identified in Service policy 605 FW 3. They also support the Refuge System Improvement Act of 1997, which identifies fishing as one of the priority wildlife-dependent recreational opportunities that should be offered on refuges when deemed to be compatible.

Increasing fishing opportunities on the refuge would serve the demand for more fishing opportunities in Sussex County. Improved habitat quality resulting from proposed habitat restorations on the refuge would likely result in improving water quality and increasing some fish populations. This could positively affect the fishing experience and fishing success.

Bank and boat fishing opportunities have been expanded, where possible, to include additional areas for fresh and saltwater fishing. Some of the program changes include allowing saltwater fishing at Fowler Beach during nighttime hours, eliminating boat launching fees at all refuge boat ramps, opening Goose and Flaxhole Ponds as primitive fishing area (boat only access, manual propulsion only, boats must be ported in), and implementing seasonal closures to protect wildlife and reduce user conflicts.

A fishery assessment conducted at Prime Hook NWR in 1994 (USFWS 1994) recommended that consideration be given to opening Flaxhole Pond due to the healthy and desirable sport fishery in the pond at that time. Access to these ponds was noted in the refuge's 1986 fishing plan as an obstacle to providing this use for visitors. However, the refuge has since acquired land that would provide that access.

To minimize fishing mortality and increase the quality of fishing, we propose to adopt catch-and-release regulations, including the mandatory use of barbless hooks, for Turtle Pond, Fleetwood Pond, Goose Pond, Flaxhole Pond, and Prime Hook Creek west of Foord's Landing.

We have proposed seasonal closures in new and existing areas that would provide opportunities for fishing; these are discussed in detail in the strategies below. One closure that is different from alternative A is the closure of the eastern portion of Prime Hook Creek from September 1 through March 15. Additional seasonal closures may apply until the second Saturday in May for hunting during the snow goose conservation order or turkey hunting.

The refuge proposes to allow fishing and crabbing at the pulloffs along Prime Hook Road due to increased visitor demand in this area and existing pulloffs already provide safe parking areas for wildlife observers and photographers. Access is restricted to only the pulloff area to provide safety for visitors and to avoid traffic issues. The refuge will consider fishing and crabbing along Broadkill Road and Fowler Beach Road in the future if there is a demand and if visitor safety and adequate parking can be guaranteed. Adequate parking and visitor safety along State-maintained roads has historically been an issue. Crabbing decreased significantly from 3,644 visits in 1976 to 880 visits in 1977 due to new regulations making state highway bridges into refuge waterways off limits in an effort to increase pedestrian safety along these roads.

The refuge will continue to partner with local bass fishing clubs to promote fishing to youngsters, provide opportunities for disabled anglers, conduct fishery assessment surveys in refuge waters, and make management recommendations.

The implementation of the refuge fishing program is consistent with State regulations and additional refuge regulations stipulated in 50 CFR. We will continue to evaluate the program on an annual basis and modify it, as warranted,

given new biological or visitor data. This plan further develops an appreciation for fish and wildlife and expands public fishing opportunities. Map 4-15 depicts recreational fishing and crabbing opportunities and infrastructure.

### Strategies

In addition to those strategies listed under Actions Common to all Alternatives affecting this program,

- Open Slaughter Canal between Fowler Beach Road and Slaughter Beach Road year round and only on Sundays from September 1 through the deer and waterfowl hunting seasons, which typically end in February. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order or turkey hunting.
- Close Prime Hook Creek (mainstem of the creek and Headquarters Canal) to anglers during the following:
  - ✱ Eastern Prime Hook Creek (from Foord's Landing to headquarters ramp): Closed every day from September 1 through March 15. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order or turkey hunting.
- Expand fresh and saltwater fishing and crabbing opportunities to include the following areas:
  - ✱ Open Fowler Beach (shore only) to night fishing by permit only
  - ✱ Open Goose and Flaxhole Pond
    - ✱ Designate this new area as a primitive fishing area.
    - ✱ Provide access by boat only; manual propulsion only; float tubes allowed.
    - ✱ Anglers must use the existing parking area and walk and carry in boat.
    - ✱ Closed every day from September 1 through March 15 to avoid conflicts with deer hunting and minimize disturbance to waterfowl. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order or turkey hunting.
    - ✱ Area will remain closed until fishery and contamination surveys are completed and management recommendations are made (see objective 3.2 of habitat management objectives).
  - ✱ Open Prime Hook Beach Road to fishing and crabbing
    - ✱ Parking only allowed on existing pulloffs and access is restricted to the pulloff area to provide safety for visitors and to avoid traffic issues.
    - ✱ The refuge will consider fishing and crabbing along Broadkill Road and Fowler Beach Road in the future if there is a demand and if visitor safety and adequate parking can be guaranteed.
  - ✱ Adopt catch-and-release regulations, including the mandatory use of barbless hooks, for Turkle Pond, Fleetwood Pond, Goose Pond, Flaxhole Pond, and Prime Hook Creek west of Foord's Landing.

- \* Regulations, such as catch-and-release and the use of barbless hooks, may be modified if fishery surveys and analysis indicate that other management options are needed to sustain healthy fish populations such as creel or size limits.
- Conduct refuge fishery inventories every 5 years to assess fishery health and water quality of aquatic habitats; documented information should consist of species composition, class size and distribution, abiotic conditions and other information to adjust management prescriptions as needed and recommended by the Service's Fishery Division. Surveyed areas should include Turtle, Fleetwood, Goose, and Flaxhole Ponds, and Prime Hook Creek. Analyze data and provide management recommendations (seasonal closures, creel size and species limits, etc.).
- Eliminate boat launching fees at all refuge boat ramps.
  - \* Maintenance to boat ramps and parking areas will be funded through deferred maintenance projects.
- Do not allow recreational gill-netting, commercial fishing, food fishing with equipment other than hook and line on the refuge, or crabbing using pots or trot lines.
  - \* The use of gill netting by commercial or recreational fishermen has occurred in the tidal waterways of Slaughter Canal for over 30 years by a small number of fishermen. These activities, whether commercial or recreational, are not consistent with goals and objectives in any refuge management plan, conflict with rod and reel recreational fishermen and wildlife observers using canoes or kayaks, and has the potential to harm non-targeted fisheries through incidental by-catch. Fishing for bait fish is permitted for recreational uses only, subject to regulations stated in Title 7 (Conservation) of the Delaware State Code.
  - \* Crabbing will only be permitted using hand lines, collapsible traps, crab nets, or hoop crab nets. Collapsible traps must be fished from the shore only and the owner must be present. Other types of crabbing equipment are prohibited. The use of crab pots could conflict with 16USC668dd, 50CFR 27.93, abandonment of property, on a national wildlife refuge, if left unattended, and the use of trot lines would cause conflicts with other recreational activities, particularly on Slaughter Canal.
- Increase or enhance disabled fishing opportunities, particularly for those permanently confined to wheelchairs, at the wheelchair-accessible fishing pier on Fleetwood Pond.
- Improve access at boat launching areas.
  - \* Enhance boat ramp access on Fowler Beach Road for access to Slaughter Canal.
  - \* Work with private landowners to improve access to the western end of Prime Hook Creek.
  - \* Within 5 years of the plan, open a boat ramp at Foord's Landing for access to Prime Hook Creek.
  - \* Designate Slaughter Canal as a no wake zone.



- Within five years of the CCP approval, develop an updated fishing plan for the refuge.
- General regulations for recreational fishing and crabbing
  - ✱ No refuge-specific permits are required, except for night fishing at Fowler Beach.
  - ✱ Catch and release regulations apply, including mandatory use of barbless hooks, for Turtle Pond, Fleetwood Pond, Goose Pond, Flaxhole Pond, and Prime Hook Creek.
  - ✱ Boats must be ported in by foot from the parking areas to Goose and Flaxhole Ponds.
  - ✱ Boat motor restrictions:
- Manual propulsion only on Goose and Flaxhole Ponds
  - ✱ Crabbing will be conducted using only hand lines, collapsible traps, crab nets, or hoop crab nets. Collapsible traps must be fished from the shore only and the owner must be present. All other types of crabbing equipment are prohibited.

**Objective 5.4 Environmental Education and Interpretation**

Provide high-quality environmental education and interpretation opportunities.

**Rationale**

To improve environmental education and interpretation on the refuge, we evaluated these programs, incorporated the opinions of visitors and community residents, and developed this plan in collaboration with our State partners in the Delaware Division of Fish and Wildlife. These program changes, which reflect a diversity of preferences and opportunities for environmental education and interpretation, strive to meet the guiding principles for a quality refuge environmental and interpretive program identified in Service policy 605 FW 6 and 7.

Expanded and enhanced opportunities in environmental education and interpretation will be accomplished through developing and implementing more interpretive guided walks (fishing, birding, nature), interpretive auto tour and hiking routes using advanced technology (radio, compact disc, cell phones, or downloadable programming), and a new public use map and regulations tear sheet, in addition to the revitalizing of the waterfowl festival in October, and continuing existing programs. The refuge also proposes to expand the visitor contact station/refuge office building. This expansion will provide offices for staff, volunteers, and the Friends Group, feature a larger auditorium, and provide storage for biological and public use programs.

This objective reflects an increase in interpretation and environmental education capability and programs. It also reflects the basic needs for a refuge to provide the necessary facilities to inform and educate visitors and help them make the most of their refuge visit. Since environmental education is curriculum-based and labor-intensive, initial efforts will be limited with existing staff, but will increase if and when staff are added.

Refuge staff will continue to evaluate the environmental education and interpretation programs on an annual basis and modify them, as warranted, given new biological or visitor data. This plan reflects a balanced and measured increase in facilities and opportunities for environmental education and interpretation, while continuing to meet fish and wildlife protection and

management responsibilities. Map 4-15 depicts facilities and infrastructure used to support environmental education and interpretation.

### **Strategies**

In addition to those strategies listed under Actions Common to all Alternatives affecting this program,

- Enhance and continue to partner with local educational institutions, refuge volunteers, Friends of Prime Hook, and other partners to plan, develop, and implement environmental education programs that focus on refuge key resources and messages for local schools, scout troops, and other organized education-oriented groups. This network would act as supporters of the refuge, advocates for environmental education, and a liaison to the community.
  - ✱ Develop a partnership with a local school district or non-governmental organization to provide funding (full- or part-time) for an onsite education specialist to coordinate the development and implementation of curriculum based environmental education programs.
  - ✱ Evaluate the potential for adult educational partnerships through universities or programs such as Elder Hostel.
- Conduct environmental education and interpretive programs in newly opened areas outlined in objective 5.2.
- Offer curriculum-based programs developed by NASP, or National Archery in the Schools program, to encourage family participation in archery shooting.
- Develop detailed environmental education and interpretive programs for the refuge that tiers to the visitor services plan.
- Increase and enhance interpretive materials and programs explaining the historic, cultural, and natural resources of the refuge to gain public awareness and understanding of their value.
  - ✱ Develop interpretive auto tour and hiking routes using advanced technology (radio, compact disc, cell phone, or downloadable programming).
  - ✱ Provide interpretive facilities and materials for newly opened areas outlined in objective 5.2.
  - ✱ Increase interpretive programs by providing more regularly guided field trips for nature, birding, fishing, photography, etc.
  - ✱ Implement a volunteer master naturalist program.
  - ✱ Develop new interpretive panels and maps for information kiosks near the refuge office and along State roads.
  - ✱ Revitalize the waterfowl festival, or similar event, celebrating National Wildlife Refuge Week in October only if additional staff is available.
  - ✱ Explore other partnerships to develop programs for various age groups.
- Expand the existing visitor contact station/refuge office building to provide offices for staff, volunteers, and the Friends Group, feature a larger auditorium, and provide storage for biological and public use materials.

**Objective 5.5 Other Recreational Use**

**Sea Level Rise and Climate Change Strategies:**

- In conjunction with conservation partners, develop useful and accessible information resources to help Americans fully appreciate the significant implications of sea level rise and climate change on refuge species and their habitats, and to engage these constituencies in seeking solutions.
- Incorporate climate change and sea level rise information and messages into interpretive sign panels, brochures, Web sites, and environmental education programs.
- Hire a temporary staffing position to assist in these outreach efforts.

Provide opportunities for the public to use and enjoy the refuge for traditional and appropriate non-wildlife-dependent recreation that is compatible with the purposes for which the refuge was established and the mission of the Refuge System.

**Rationale**

Much of the basis for other recreational use is described under Actions Common to All Alternatives. Non-priority recreational uses that the refuge manager proposes as compatible on this refuge, with stipulations, are detailed in appendix E.

**Strategies**

In addition to those strategies listed under Actions Common to all Alternatives affecting this program,

- Allow commercial photography.
  - ✱ Guidance in 43 CFR Part 5 will be followed for fees related to commercial filming and still photography.
- Prohibit commercial fishing, commercial trapping of muskrat, raccoon, etc., turtle trapping, picnicking, 5K road race, beekeeping, waterfowl retrieval permits, dog walking, roller blading, competitions or organized group events, and non-competitive organized events.

**GOAL 6.**

**Outreach and Community Partnerships**

Collaborate with the local community and partners to complement habitat and visitor service programs on the refuge and the surrounding landscape.

**Objective 6.1 Community Outreach**

Increase community outreach by conducting up to 15 outreach programs or events\* each year, and initiate up to 10 news articles to increase community understanding and appreciation of the refuge's significance to natural resource conservation and its contribution to the Refuge System, and to garner additional support for refuge programs.

**Rationale**

Much of the basis for community outreach is described under Actions Commons to All Alternatives. Opportunities for community outreach would be enhanced from alternative A.

\*Note: These events will be both onsite and offsite, and are the same (not additive) as those discussed under alternative B, objective 5.4.

**Strategies**

In addition to those strategies listed under Actions Common to all Alternatives affecting this program,

- Increase outreach in conjunction with interpretive programs under alternative B, objective 5.4 by offering additional and more diversified activities, special events, or programs.
- Create and improve outreach materials and continue to issue news releases on significant accomplishments, advertise special events, and announce major management initiatives.
  - ✱ Update refuge fact sheets.
  - ✱ Create media press kit to promote events scheduled on the refuge.
  - ✱ Enhance Web page with virtual tours of the refuge and a wildlife webcam.
- Participate in those community service, professional association, and Chamber of Commerce events throughout the Delaware Bay ecosystem that would provide the greatest benefit to achieving goals and objectives and furthering the mission of the Refuge System.
  - ✱ Coordinate with the Delaware Division of Fish and Wildlife and other partners to develop outreach materials better explaining the refuge's habitat management and visitor services programs.
- Conduct public meetings, as needed, to facilitate communications and raise awareness and understanding of, and seek support for, refuge management programs.

#### *Climate Change and Sea Level Rise Adaptation Rationale*

A survey to gauge the opinions of Delawareans on climate change and sea level rise was conducted in 2010 by the Delaware Department of Natural Resources and Environmental Control (DNREC) and received responses from more than 1,500 Delawareans. The respondents were asked questions to gauge their knowledge, concerns, attitudes, perceptions, and opinions about the issues involving climate change and sea level rise. When asked to rank lists of general and environmental issues, respondents ranked climate change and sea level rise last on both lists (DNREC 2010). The survey indicated that Delawareans were aware of climate change and sea level rise and, while ranking those issues very low, they were concerned with other issues related to climate change and sea level rise, such as water pollution, air quality, and loss of forest habitat (DNREC 2010). The results of the survey illustrate that there is more work to be done to increase awareness of climate change and sea level rise. The refuge will work to better inform the public about climate change and sea level rise and relay how the Service and the refuge plan to address these issues.

The Service proposes as a goal in its draft appendix: 5-Year Action Plan for Implementing the Climate Change Strategic Plan (USFWS 2009b), that “We will engage Service employees, our public and private partners, our key constituencies and stakeholders, and everyday citizens in a new era of collaborative conservation to seek solutions to the impacts of climate change and other 21st century stressors to fish, wildlife, and habitats.” Proposed actions include providing Service employees with climate change information, education and training; sharing climate change information, education, and training opportunities with external audiences; and forging alliances and creating forums on climate change to exchange information and knowledge and to influence policy internationally. Our strategies, as outlined in this document support this goal.

#### *Sea Level Rise and Climate Change Strategies*

In conjunction with conservation partners, develop useful and accessible information resources to help Americans fully appreciate the significant implications of sea level rise and climate change for refuge species and their habitats, and engage these constituencies in seeking solutions. These strategies are supported by the Service's strategic plan for responding to accelerating climate change objective 6.2.

- Incorporate these messages into interpretive sign panels, brochures, Web sites, and environmental education programs.
- Hire a temporary staffing position to assist in these efforts.

#### **Objective 6.2 Private Landowner Assistance**

Work with regional and State partners to develop a common, consistent message.

- Within 5 years of CCP approval, establish a greater role assisting landowners who seek to maintain and improve wildlife habitat on private lands within and adjacent to the refuge boundary.

#### **Rationale**

Much of the basis for private landowner assistance is described under Actions Common to All Alternatives. Additional staffing will expand refuge assistance to private landowners. There are funding sources specifically targeted for improving wildlife habitat on private lands that could be competitively directed to the refuge to implement on-the-ground projects.

#### **Strategies**

In addition to those strategies listed under Actions Common to all Alternatives affecting this program,

- Expand our technical assistance capability to assist private landowners on invasive species identification and control, wetland protection, and habitat restoration and management.

#### *Climate Change and Sea Level Rise Adaptation Rationale*

Adaption to climate change and sea level rise requires the refuge to consider lands and waters outside the refuge boundaries. There are several partnership incentive programs that could be used to create collaborative conservation partnerships such as Partners for Fish and Wildlife, safe harbor agreements, habitat conservation plans, Natural Resource Conservation Service incentive programs, etc. These strategies are supported by the Service's strategic plan objective 2.3.

One example of a potential partnership is restoring the natural hydrology to lands that may or currently are impacted by sea level rise. In many cases ditches, some of which were dug more than 50 years ago to drain farmland and control mosquitoes, now serve to transport brackish water inland, a problem that could become increasingly prevalent as sea level rises. Saltwater intrusion into agricultural soils and peat collapse are major consequences of this process. Plugging ditches in selected places to reduce saltwater flow inland could be effective for local stakeholders. Another option is to install new water control structures, such as tide gates, in selected locations (Poulter et al. 2008). This technique is currently being used elsewhere on the Delmarva Peninsula. Plugging ditches would also help restore natural drainage patterns to the marshes.



### Objective 6.3 Regional and Community Partnerships

#### *Sea Level Rise and Climate Change Strategies*

- Work with partners to identify how key ecological processes are likely to be affected by climate change
- Determine how management actions might help maintain or restore key ecological processes using the various incentive programs offered Federal and State agencies and other conservation organizations.

Within the next 15 years, enhance our existing partnerships, and seek additional, collaborative relationships with Federal, State, and local government agencies and regional and community economic development and conservation organizations to fulfill mutual natural resource conservation mandates and help us meet our wildlife, habitat, and visitor services objectives.

#### **Rationale**

Much of the basis for regional and community partnerships is described under Actions Common to All Alternatives.

#### **Strategies**

In addition to those strategies listed under Actions Common to all Alternatives affecting this program,

- Enhance our existing collaborative relationships, and seek additional ones, to increase the likelihood of meeting natural resource mandates and objectives.
- Participate in regional and local community economic development and conservation partnerships and initiatives.
- Facilitate demonstration areas on the refuge and on other conservation lands that showcase applied management to benefit natural resources.
- Enhance the volunteer program to better assist with accomplishing refuge projects
  - ✱ Develop a refuge volunteer plan and handbook that covers volunteer program coordination, training, job descriptions, volunteer policy, recruitment policy, monitoring, evaluation, dispute, and termination policies.
  - ✱ Explore the possibility of constructing a bunk house or other similar type housing for interns and volunteers to support the refuge's biological and public use programs.
  - ✱ Expand the resident workcamper volunteer program.

#### *Climate Change and Sea Level Rise Adaptation Rationale*

The rationale is the same as stated above under objective 6.1.

#### *Sea Level Rise and Climate Change Strategies*

- Work with Federal, State, and conservation organizations on land acquisition priorities.
- Enhance existing and develop new partnerships to conduct research related to fish and wildlife adaptation to climate change and sea level rise on the refuge, in neighboring watersheds, and elsewhere in the State of Delaware.
- Within 1 year, establish a cooperative agreement with the Delaware Coastal Program on research and monitoring needs for the refuge.

## **Alternative C. Historic Habitat Management**

This alternative emphasizes a return to habitat management programs that were conducted on the refuge through most of the refuge's existence, but which were stopped in recent years for a variety of reasons. These historic habitat management programs include the use of cooperative farming in upland refuge fields, and management of freshwater wetland impoundments, both conducted for the benefit of migratory birds. In 2006, a lawsuit against the refuge charged that farming was being conducted on the refuge without having been properly evaluated through NEPA and a compatibility determination. In 2009, the refuge was ordered to cease farming until the practice could be properly and transparently evaluated during the CCP process. Thus farming has not been a part of recent refuge management, but is evaluated as a component of this alternative.

Similarly, management of freshwater impoundments was conducted on the refuge from the early 1980's, until 2009. Breaches along the refuge shoreline introduced full tidal flow of salt water into the impounded refuge wetlands, converting the freshwater wetlands into brackish/salt marsh and large expanses of open water and prohibiting freshwater impoundment management as conducted previously. As described in chapter 3, the freshwater impoundments at the refuge were successful at providing quality foraging and roosting habitat for migrating and wintering waterfowl. However, as outlined in that same chapter, significant obstacles must be overcome in order for these impoundments to be managed into the future as they have in recent decades. Significant environmental, physical, and structural changes and management actions would need to be addressed to return to freshwater impoundment management on the refuge, and those strategies are outlined within this alternative.

When the Service installed its water management structures in 1988, it utilized the existing east-west roads through the marshes to the barrier island to form the barriers to open water movement. On several occasions the State redistributed sand on the barrier island without bringing in any supplement sand, and on one occasion, brought in a small amount of sand. These approaches were successful in maintaining the integrity of the barrier, even as it continued to erode from the bayside, see Chapter 1. As indicated at the beginning of this Chapter, under Actions Considered by Eliminated from Detailed Analysis, the approach of redistributing the sand on the barrier, is infeasible because there is not enough sand to effectively maintain an intact barrier and prevent salt water from entering the impoundments. As soon as salt water enters the impoundments in sufficient quantity, salt intolerant vegetation dies. Therefore, to be robust enough to last through most anticipated storms, a major beach engineering approach will be required.

Under this alternative, public use programs would be modified somewhat from current management, but not as extensively as in Alternative B. Compared to alternative A (current management), for visitor services programs and refuge uses, alternative C would expand opportunities for hunting and have a greater emphasis on public outreach and education. Fishing, wildlife observation, and wildlife photography would be similar to alternative A (Map 4-25). Compared to alternative B, proposals for hunting in alternative C would decrease the amount of hunting opportunities.

Under alternative C, we would further enhance local community outreach and partnerships, continue to support a Friends Group, and continue to provide valuable volunteer experiences. We would also promote research and the development of applied management practices through local universities to sustain and enhance natural composition, patterns and processes within their range on the Delmarva Peninsula.

Staffing levels would be similar to alternative A (current management).

To reduce repetition, much of the objectives and rationale explained in earlier sections (actions common to all alternatives, alternative A, and alternative B) are relevant to alternative C, but are not included here.

## GOAL 1.

### Barrier Beach Island and Coastal Salt Marsh Habitats

Manage, enhance, and protect the dynamic barrier beach island ecosystem for migratory birds, breeding shorebirds, and other marine fauna and flora. Perpetuate and restore the biological integrity, diversity, natural sustainability, and environmental health of North Atlantic high and low salt marsh habitats.

The objective of traditional beach nourishment is to protect the shoreline from storm damage or to stop erosion.

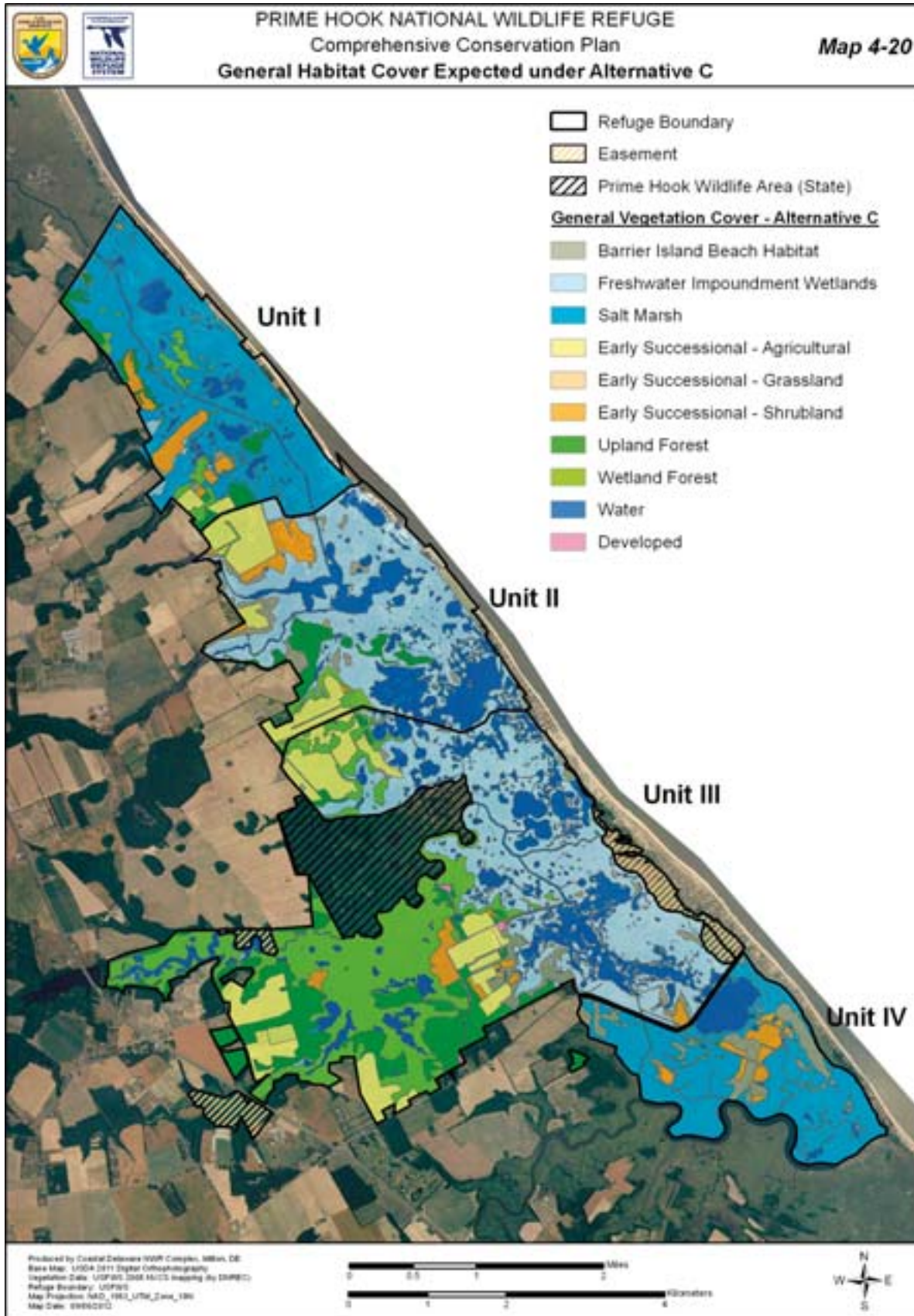
The USACE sediment replenishment projects are those which are designed to add sand to beaches.

Beach replenishment actions designed to maintain prior beach profiles are commonly conducted by the U.S. Army Corps of Engineers (USACE). The (USACE) describes beach nourishment, also referred to as beach replenishment, as a process by which sediment (usually sand) lost through longshore drift or erosion is replaced from sources outside of the system and is deposited on an eroding beach. Nourishment is typically a repetitive process, since nourished beaches tend to erode faster than natural beaches, due to the sediment deficit of the area, the lack of established beach grass and vegetation to hold the sand in place, and the fact that most beach nourishment projects are placed too far seaward due to existing construction on the beach. DNREC does not conduct this sort of beach nourishment on state owned natural beaches. (DNREC 2004) Since the barrier beach along the eastern boundary of the refuge is not backed by houses, it is not imperative for it to be replaced in the exact same alignment as the current beach, but even if it were to be placed somewhat inland of its current alignment, given the erosional forces and sea level rise, any such project will still require substantial quantities of sand both to form the new barrier and to regularly replace the material that is lost to erosion.

Like icebergs, a barrier beach contains a relatively small amount of its structure above water. The subsurface extent of the barrier island extends substantially off-shore and the gradual slope of off-shore sediments both serve to 'feed' the visible beach face and to dissipate wave energies, thus protecting the beach and dune from erosion. Typically, the amount of submerged sand (in an offshore bar) eroded is much greater than the amount of visibly missing sand onshore (sandy beach face). Nourishing a beach that has little submerged sand requires addressing the reason that the submerged sand is missing. Replacing only the visible sand is insufficient without replacing the sand off shore that supports any accretion process to maintain the dune and beach naturally. If insufficient sand is placed on the upper beach without extending the supplemental sand over a substantial amount of the subtidal area, the beach is unstable and the visible sand quickly erodes (Psuty 2004). Thus, in any planning phase of a beach nourishment project, it is important to develop an accurate understanding of the local sediment budget. Knowledge about the sediment budget and natural sediment movement provides a framework for understanding the complex coastal processes that take place in the vicinity of the project area. (NOAA 2011).

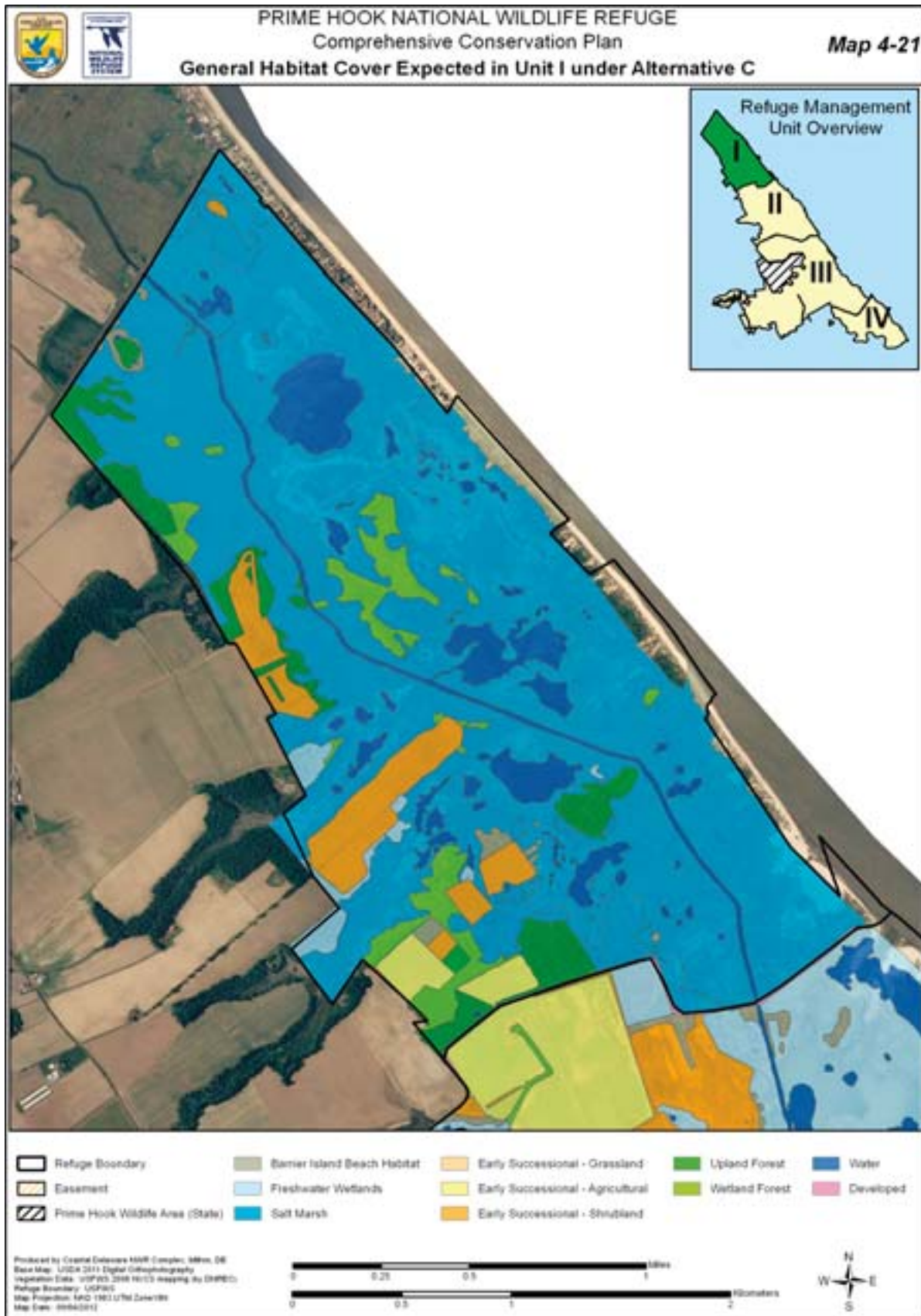
The refuge's sandy beach habitat is representative of a microtidal, wave-dominated, barrier formed along the Delaware Bay's sandy coastline with a tidal

Map 4-20. Overview of general habitat cover under alternative C



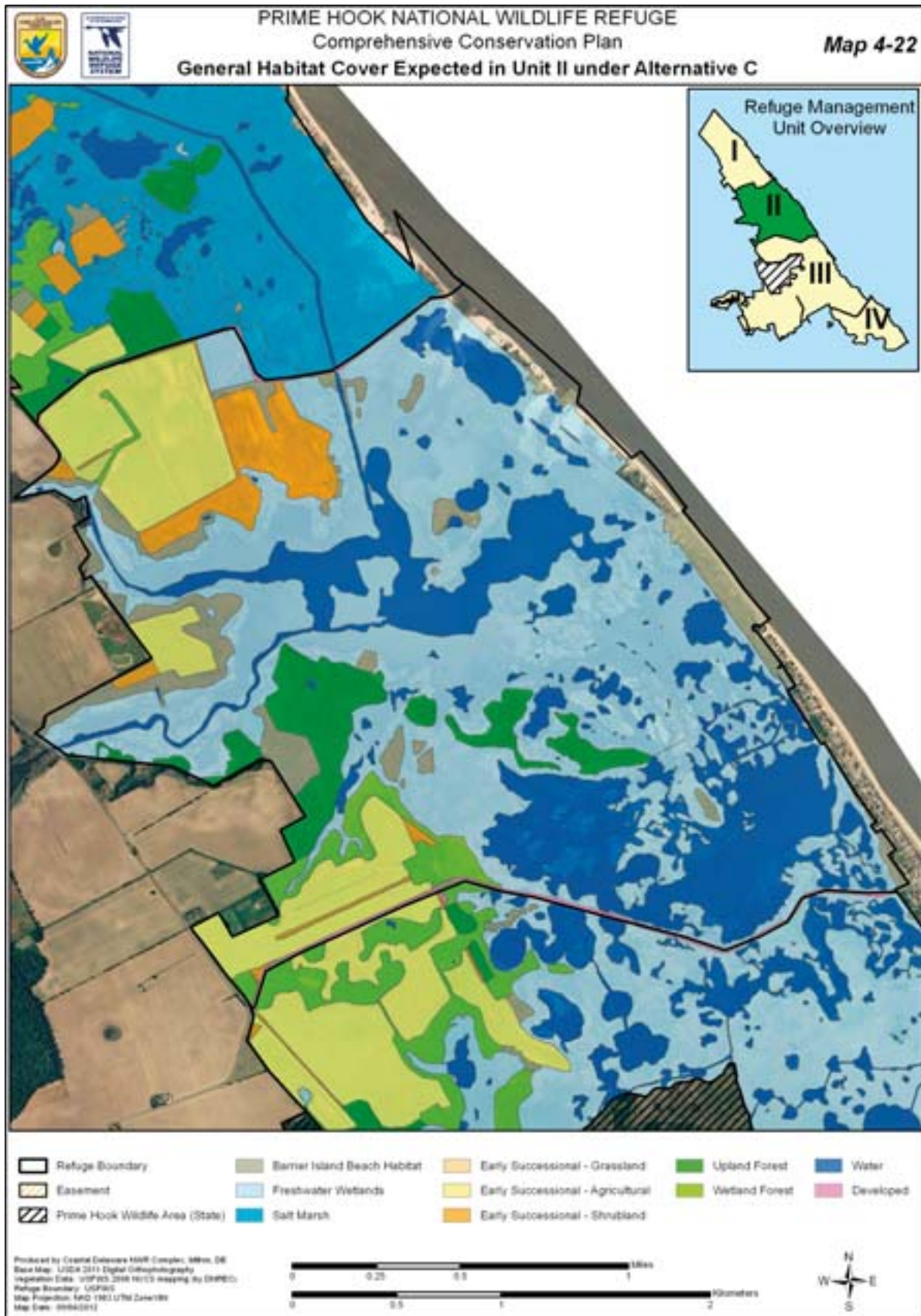


Map 4-21. General habitat cover in Unit I under alternative C



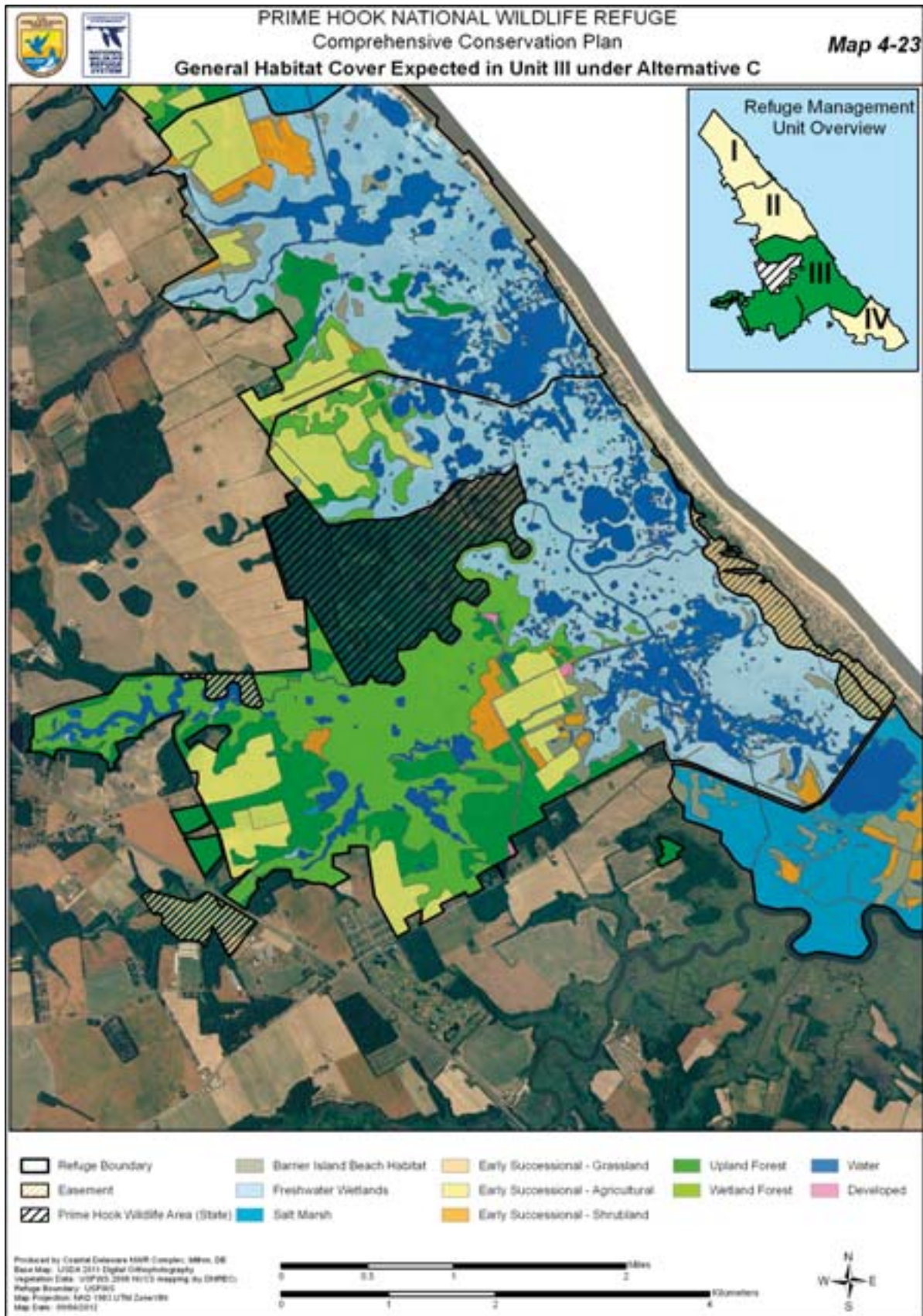


Map 4-22. General habitat cover in Unit II under alternative C



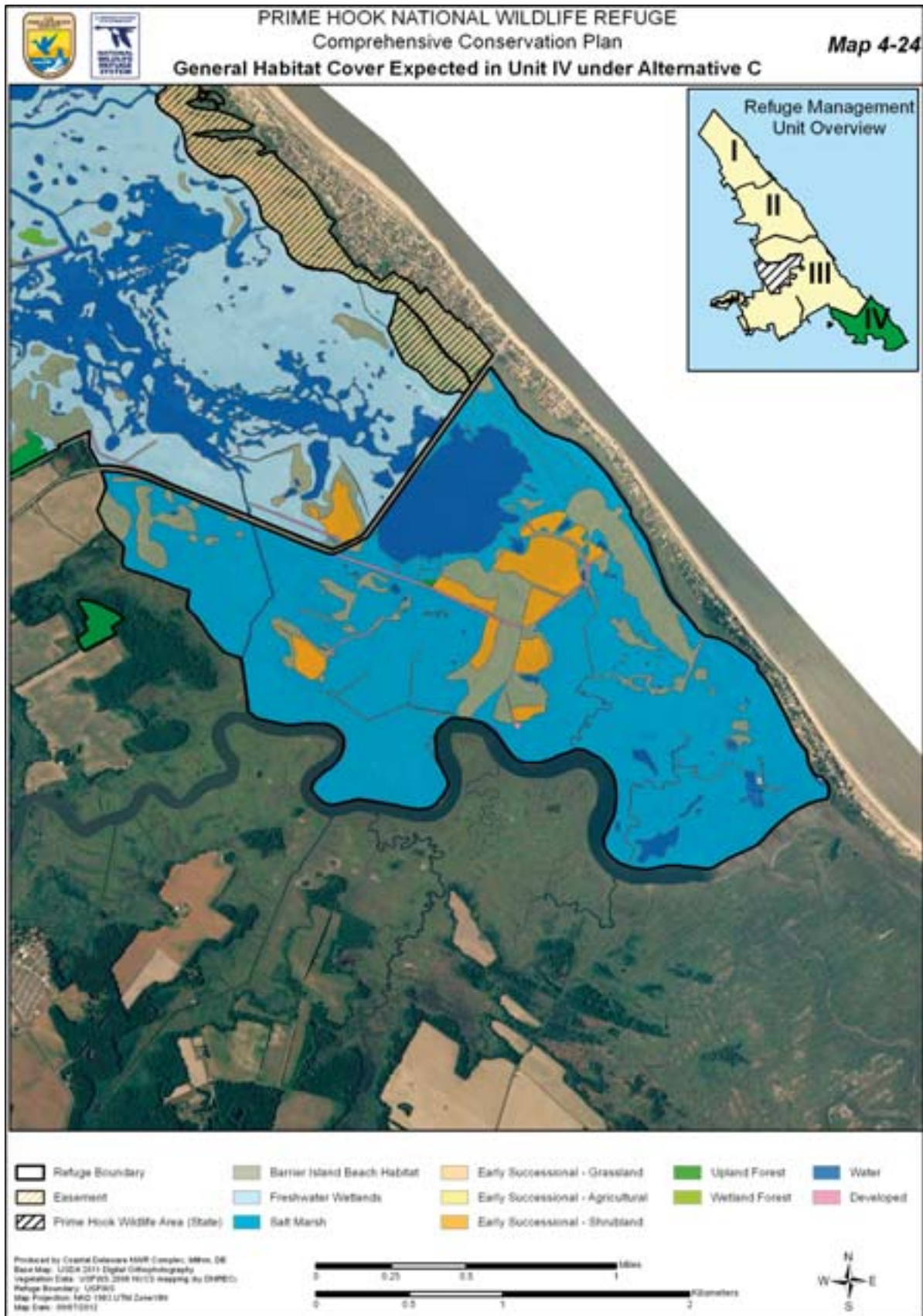


Map 4-23. General habitat cover in Unit III under alternative C

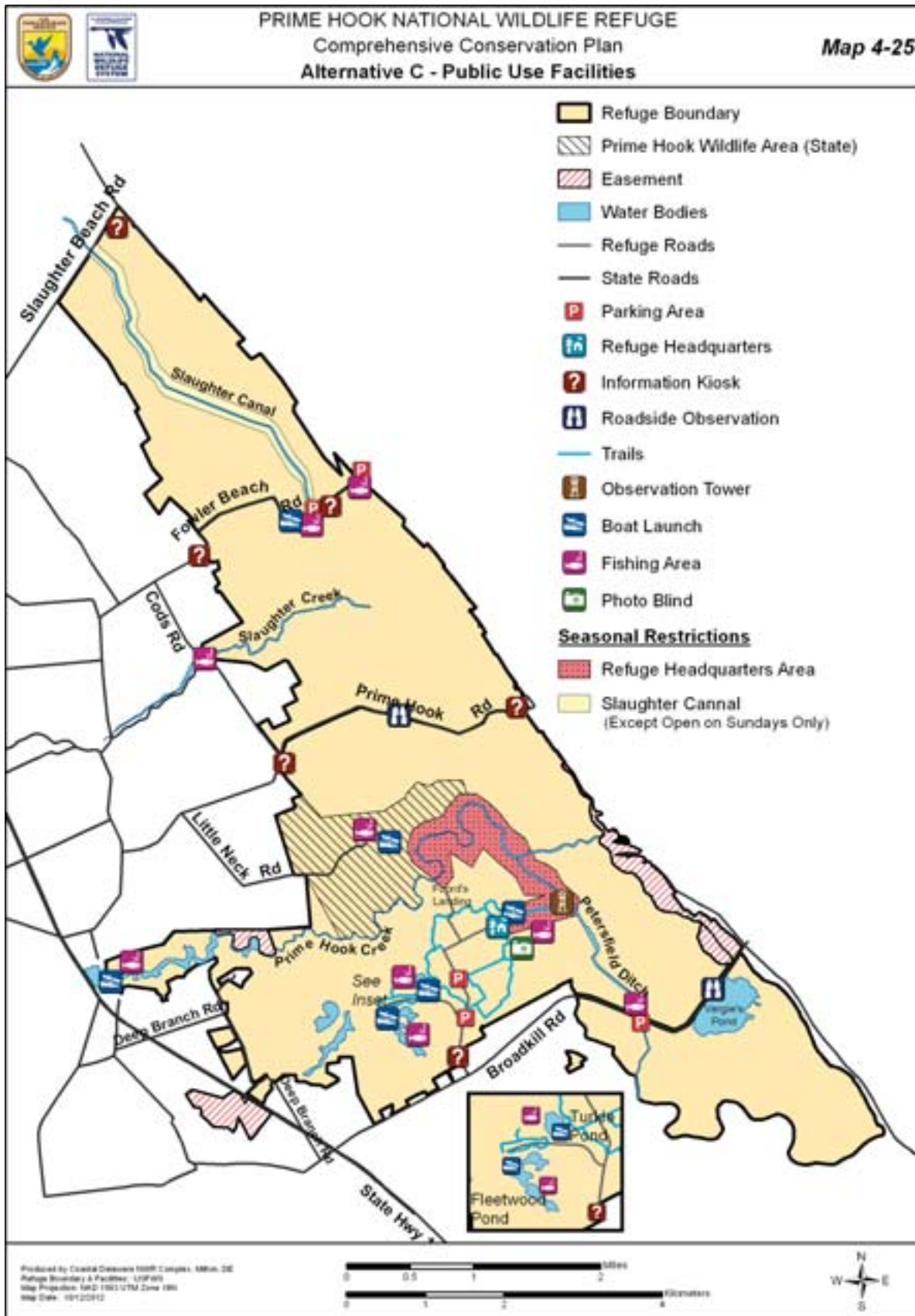




Map 4-24. General habitat cover in Unit IV under alternative C



Map 4-25. Public use opportunities under alternative C



range of less than 6 feet (Komar 1998). Leatherman (1988) further distinguishes between two types of classifications based on sediment supply conditions. Transgressive indicates sand deficiency and propensity for shoreline migration landward. Regressive denotes accretion, often evidenced by multiple dune ridges or crests. The refuge's barrier is best described as a microtidal transgressive barrier system, which is the less stable and more vulnerable to storm-induced changes than a wider beach. This type of barrier is long and narrow with a few inlets and is characterized by low-lying topography and numerous washovers, indicating deficient sand supply and relatively rapid shoreline retreat (Leatherman 1988). Beach nourishment to stabilize dunes on such a barrier by using repetitive beach nourishment projects, can interfere with the long-term viability and is very costly. Beach nourishment does not halt the physical forces that are constantly acting on a microtidal transgressive system. To maintain its environmental health and to sustain the barrier and salt marsh system in the face of sea level rise, the barrier needs to migrate.

The shorelines of barrier island morphology are extremely changeable. The dynamism of the natural coastal processes characteristic of barrier island habitats means that beaches will constantly erode and accrete, dunes and shorelines will shift positions, overwash fans will be periodically active, and inlets will open, migrate and close (McLachlan and Brown 2006, Psuty 2004, Kraft et al 1975). Inlets are also the primary means by which sand is transported landward across a migrating barrier island system. They open and close in response to changing conditions and will migrate up and down along a barrier shoreline, provided they do not encounter an obstacle such as a road or jetty. Inlets that periodically form along microtidal coasts tend to close unless there is substantial outflow of water from inland sources (Leatherman 1988).

Beach nourishment has been used for dune stabilization mostly to protect recreational beaches and developed barrier island strands, but costs tens of millions of dollars annually. For example, shortly after Northeast winter storms of 1992-1993 opened a breach east of Fire Island National Seashore (Westhampton Dunes Section), just down drift of a group of groins installed decades before to stem erosion in the Hamptons. The inlet was reclosed using beach nourishment of 1.5 million cubic yards of sand at a cost of \$6.2 million by the USACE and has to be renourished about every four years. We do not have precise cost projections for the construction and long-term replenishment costs to maintain a barrier island across the eastern side of the refuge with sufficient integrity to withstand a major (100 year ) storm, but it could easily be millions of dollars.

Heavy equipment, dredge pipes, and other activities necessary to construct this action, as well as the regular replenishment actions, will affect beach and dune habitats and the species nesting, feeding, or resting there. While some activities can be timed outside of the active shorebird nesting season, there will still be repetitive disturbance to these habitats and to vegetation, invertebrate communities, and other species which do not migrate.

The use of sand nourishment to repair the breaches south of Fowler Beach Road has been suggested by many members of the public. It has been suggested that the refuge should re-establish the barrier to reduce erosion or flood risk to nearby developed properties. The Service empathizes with the plight of landowners on the very low-lying barrier island and continues to explore alternatives for access to the barrier under high water conditions, but it cannot be responsible for private decisions to construct in flood prone and vulnerable locations. This alternative is not under consideration as a means of flood damage protection for adjacent development.



Others have suggested that reconstruction of the barrier island will reduce salt water intrusion into local farmland. As explained above, both land subsidence and sea level rise are occurring in this area and subsidence occurs through compaction of the soil, ground water drainage and ground water withdrawal. Service-owned former uplands have already been affected by salt water intrusion, and the Service does not withdraw ground water and has halted agricultural activities on much of the refuge. Refuge lands, as well as private farmlands surrounding the refuge, share the common future of increased saturation by salt water. As the refuge lands become increasingly saturated, they will transition to more moist and salt-tolerant vegetation; private lands are likely to be less able to support traditional agricultural crops. Salt marsh haying or, if sufficient fresh water supplies are available, perhaps freshwater impoundments or cranberries may be feasible on these more saturated uplands.

Alternative C is being evaluated in recognition that the refuge once supported thousands of acres of fresh water marsh and moist soil habitat, which was a very valuable for certain migratory birds. Under all of the Alternatives, the refuge will continue to have beach and marsh habitats which are important to other species of migratory birds, but it is likely to have reduced numbers of mallards and/or pintails under Alternatives A or B.

Given the environmental impacts arising from beach nourishment, there would need to be additional NEPA and other environmental reviews, based upon more specific engineering designs, which have not been developed at present. In addition to other significant environmental impacts, the two strongest factors tempering the likelihood of implementation of this alternative are the high costs, which are clearly outside of any budget likely to be appropriated to the Service, and the fundamental problem of project integrity. Recognizing how quickly freshwater vegetation dies if rapid salt water intrusion occurs, if a dune and beach system is designed to be sufficiently robust to withstand any likely coastal storm, it will have to be quite large, and it may deflect wave forces to adjacent areas. If it is designed at a lower level of structural integrity, then given the increasing likelihood of sea level rise, increased storminess or increased intensity of storms with climate change, its ability to meet the purpose of the project would be compromised. Of the three alternatives, Alternative C is therefore least likely to be able to meet the project's purpose of sustainability and adaptability in the face of climate change and sea level rise or be economically realistic.

#### **Objective 1.1 Overwash, Sandy Beach and Dune Grassland Habitats**

Allow natural processes to affect the evolution and functioning of coastal landforms and habitats (including sandy beach, overwash tidal flats, dune and grasslands, and mudflats) along approximately 1.5 miles of shoreline only in Unit I, as they naturally evolve in order to conserve spawning horseshoe crabs, American oystercatcher, and other State and federally listed beach nesting bird species, and provide feeding and staging habitats for sanderlings, whimbrel, and other migratory shorebirds

#### **Rationale**

BCR 30 has the densest human population of any region in the country. The highest priority bird species listed for immediate conservation action are those that have sustained the greatest loss of beach, sand, overwash, and dune grassland habitats in this region and State. Development of roads and homes along and in these habitats has been and continues to be the primary factor for imperiling listed bird species along the Delaware Bayshore and BCR 30 Atlantic coastal areas.

Barrier beach island habitats are storm-maintained ecosystems, and are the preferred habitats of many migrating and breeding shorebird species identified

as of greatest conservation need by both State and regional conservation plans. The protection and conservation of these birds entails allowing the dynamic nature of these habitats to perpetuate, as they are critical for many rare species like American oystercatchers, least and common terns, piping plovers, black skimmers, beach dune tiger beetles, and seabeach amaranth that are all dependent on habitats maintained by coastal storms. Under this alternative, naturally functioning barrier beach habitats are limited to the shoreline of Unit I, whereas such habitats within Unit II are subject to manipulation in order to support the management of freshwater impoundments.

#### Strategies

- Permit the natural processes of inlet formation, sand migration, and overwash development only in Unit I
- Monitor resources of concern and conduct baseline inventories and surveys as funding and staffing allows
- Conduct seasonal beach closures if and when Federal or State endangered shorebird species attempt to nest on refuge overwash habitat

#### Objective 1.2 Maritime Shrub and Forested Habitats

Continue passive management of approximately 320 acres of successional maritime salt shrub and successional maritime forest and maritime red cedar woodland habitats.

#### Rationale

Same as Alternative A

#### Strategies

Same as Alternative A

#### Objective 1.3 North Atlantic Low and High Salt Marsh Habitats

Conserve approximately 2,200 acres of existing refuge salt marsh resources, located in Units I and IV, for the benefit of salt marsh-dependent species, to include a mix of high and low *Spartina* salt marsh, pool panne, and irregularly flooded eastern tidal salt shrub habitats.

#### Rationale

Same as under alternative B, objective 1.3

#### Strategies

- Restore the natural hydrology to existing tidal marshes in Unit I and Unit IV whenever feasible and allow natural processes to occur that increase tidal flows to salt marsh habitats.
- Develop an adaptive management framework for *Phragmites* control so treatments are monitored and evaluated for effectiveness. The refuge will be using an integrated approach to *Phragmites* control, which will consider restoration of natural processes, herbicides, prescribed burning, biocontrol, and other tools as they are developed.
- Control additional invasive species if and when they are encountered in the salt marsh
- Use obligate salt marsh passerines, such as the seaside sparrow, as indicators of biological integrity, diversity, and environmental health (BIDEH) for salt marsh habitats.